THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

APRIL, 1896.

PNEUMOCOCCUS-ABSCESS OF THE OVARY, WITH REPORT OF THREE CASES.

By J. H. Etheridge, M.D.,

PROFESSOR OF OBSTETRICS AND GYNECOLOGY, RUSH MEDICAL COLLEGE, CHICAGO, ILLINOIS; GYNECOLOGIST TO THE PRESBYTERIAN HOSPITAL AND THE POLYCLINIC HOSPITAL; CONSULTING GYNECOLOGIST TO THE ST. JOSEPH'S HOSPITAL; EX-PRESIDENT OF THE CHICAGO GYNECOLOGICAL SOCIETY; FIRST VICE-PRESIDENT OF THE AMERICAN GYNECOLOGICAL SOCIETY; FOUNDATION MEMBER OF THE INTERNATIONAL ASSOCIATION OF GYNECOLOGISTS AND OBSTETRICIANS, ETC.

Several different bacteria produce pus. They are called "pyogenic" or "pus organisms." The chief ones are the *staphylococcus aureus*, the *streptococcus pyogenes*, the *bacillus pyocyaneus*, the *bacillus pyogenes fœtidus*, the *bacillus coli communis*, the *bacillus tuberculosis*, the *bacillus proteus*, the *staphylococcus epidermidis albus*, the *micrococcus lanceolatus*, or the *diplococcus pneumoniæ*. The most characteristic purulent inflammations are produced by the *staphylococcus* and the *streptococcus*. The staphylococcus is much more likely to produce circumscribed purulent inflammations or abscesses. The majority of abscesses of the ovary are the work of the staphylococcus. A few ovarian abscesses contain the colon-bacillus. A few other pyogenic bacteria have been found in purulent collections in ovarian structures.

Up to date I can find no reported cases of ovarian abscesses produced by the *micrococcus lanceolatus*. It is my rare privilege to report three cases of this affection. The files of the *Index Medicus* fail to reveal a single reported case.

The *micrococcus lanceolatus* bears many synonyms, such as *diplococcus pneumoniæ, micrococcus of sputum septicæmia, pneumococcus of Fränkel and Weickselbaum, streptococcus lanceolatus Pasteuri, diplococcus lanceo-*

latus, meningococcus, micrococcus pneumoniæ cruposæ, micrococcus Pasteuri, bacillus septicus sputigenus vel *salivarius.*

This organism was first discovered in 1880 by Dr. Sternberg, the Surgeon-General of the United States Army, in his saliva. The bacteriological world unites in according its discovery to this gentleman. With characteristic modesty he names it the "*Micrococcus Pasteuri,*" ignoring himself utterly. The writer thinks it should bear the name "*Micrococcus Sternbergi.*" The micrococcus lanceolatus ranks as the third most frequent cause of human inflammations after the pyogenic staphylococci and streptococci.

Something of interest can be said of this coccus, especially as to where it may be found and as to what it may do. It is found upon free surfaces, like mucous membranes, and in the body, as the blood and solid organs. It is found in the cellular tissue of the neck, in the mediastinum, and even in the conjunctiva. Occasionally it is found in the blood and in the juice of the spleen. It is said to pass into the fœtus in pregnant women. (Viti.)

The range of inflammatory processes produced is surprisingly large. In 1886 it was shown to be the sole specific cause of lobar pneumonia by Fraenkel and Weickselbaum. This coccus is found in the exudations in the cavum tympani and ethmoidal labyrinth. It is one of the causes of osteomyelitis and periostitis. It can cause acute ulcerative endocarditis. It is found in the buccal and naso-pharyngeal cavities of healthy persons. From these localities one can easily understand how it can invade the lungs and cerebral meninges. Foa and Bordoni regard it as the sole cause of cerebro-spinal meningitis. More recent researches, however, have modified this opinion somewhat, so that at present bacteriologists affirm that a small percentage of this malady is caused by other bacteria. It is a frequent cause of broncho-pneumonia. It can produce all kinds of inflammatory exudate—serous, sero-fibrinous, and purulent. It produces inflammations in any of the mucous and serous membranes. It may cause septicæmia. It is frequently the cause of arthritis. It produces abscesses in the parotid and thyroid glands, in the kidney, and in the liver. It is the most frequent cause of meta-pneumonic pleurisies, including empyema. (Welch.)

It may be mentioned as a curious bit of chemical information that Grimbert's experiments, recently prosecuted, show that this coccus determines fermentation in glucose, saccharose, lactose, maltose, raffinose, dextrin, galactose, arabinose, mannite, dulcite, glycerin, and starch. The products of this fermentation vary according to the nature of the sugar employed, being ethyl alcohol, acetic acid, succinic acid, and lævorotatory lactic acid. (*Proc. Paris Acad. Sciences,* November 18, 1895.)

Serum-therapy from immunized animals, employed in pneumonia in human beings, has thus far proven negative. Rabbits may be made

completely immune by repeated injections of diluted cultures of progressively increasing virulence, so that 30 c.cm. of cultures of full virulence are borne without any striking disturbance. It is a curious fact that the serum from immunized rabbits can cure pneumococcus-infection in rabbits and mice. (Emmerich.)

Thus it is seen that this organism is of the highest importance. Its range of pathological manifestations is very large. To its already widely known fields of invasion in the human body is herewith added another one, hitherto unrecorded, so far as the writer's knowledge extends.

CASE I.—I am indebted to Dr. H. B. Stehman for the privilege of examining the pus in this case:

Mrs. C., aged twenty-eight years, never strong, never had pneumonia, married six years, sterile. Became acutely ill March 23, 1894, with great pain and tenderness in the right iliac fossa; fever and vomiting. Was crippled and ill from that date till her operation, August 21, 1894, during which period of time she had lost thirty-two pounds of flesh and experienced menstrual irregularities for the first time in her life.

Examination revealed an inextricable matting together of her pelvic organs. Nothing definite beyond this condition of affairs could be satisfactorily outlined.

The operation was performed August 21, 1894. Upon opening the abdomen the right ovary was found much enlarged and attached to the omentum, intestines, and uterus. In removing the ovary the abscess contained in it was ruptured, and about four drachms of pus escaped into the peritoneal cavity. This pus was subjected to careful bacteriological examination, and the only micro-organism found was the *micrococcus lanceolatus*.

Description of the specimen. The surrounding adhesions were uniformly distributed over the surface of the ovary, which was occupied by a mono-celled abscess about two inches in diameter. The pus that it contained was greenish-yellow, thick, and very tenacious. The pyogenic wall was lined with a ragged, thick, yellowish, fibrinous material. No communication existed between the abscess-cavity and the lumen of the Fallopian tube, which was adherent to the ovary.

Bacteriological examination. Cover-slip preparations from the pus, stained with aniline water solution of gentian-violet, showed very numerous lance-shaped cocci arranged in single pairs or short chains. Preparations treated by Welch's method (glacial acetic acid, stained with aniline water solution of gentian-violet, and washed with 4 per cent. solution of sodium chloride) showed the cocci to be surrounded by well-developed capsules. They were stained by Gram's method.

Cultures. On faintly alkaline glycerin agar-agar (5 per cent.) at 37° C., after twenty-four hours, cultures from the pus gave a pure culture consisting of a fine white growth. There was no growth at room-temperature. Cover-slip preparations from the pus showed cocci, distinctly lance-shaped, arranged in single pairs or short chains and staining by Gram's method. No capsules in the cultures. A rabbit was inoculated subcutaneously with one-half c.cm. of the pus from the abscess. It was sick for five or six days, and then improved. On the ninth day after inoculation it was killed, and a small abscess found in the abdominal wall at

the point of the inoculation. Cover-slip preparations and cultures from the pus in the abscess gave results identical with those in connection with the ovarian abscess.

Sections of the ovary, hardened in alcohol, and stained by Gram's method, showed a few diplococci in the wall of the abscess. Sections stained with hæmatoxylin and eosin showed the wall of the abscess to consist of a dense fibrous external portion, the inner portion being densely packed with small round cells.

CASE II.—Mrs. M., aged twenty-five years, married seven years, had borne three children, of whom the youngest was eighteen months old. She had had two miscarriages, in May and November, 1894. She made a poor recovery from the miscarriage in May, and dates all of her trouble from that time. Her chief complaint was pain in the left iliac region. She was never free from it until after laparotomy. Between May, 1894, and May, 1895, she says she had two abscesses break into the rectum. She gives no history of pulmonary disease in the past.

Examination, May 21, 1895, showed a perfectly anchylosed uterus with a small spot of fluctuation on the left side and excessive tenderness throughout the whole pelvis.

Operation, May 22, 1895. The pelvis contained numberless adhesions between the omentum, intestines, uterus, tubes, ovaries, and bladder. The right ovary was cystically degenerated, right salpingitis existed, and the left ovary, as large as a pullet's egg, and containing an abscess, was ruptured.

Description of specimen. Ruptured adhesions existed throughout the entire periphery of the ovary. The tube was firmly bound to the ovary. Its fimbriated extremity was patent, its lumen was not dilated, but its walls were slightly thickened. The folds of its mucous membrane appeared normal. The wall beyond the mucous membrane showed only a few areas of small-cell infiltration. Upon separating it from the ovary no communication between the abscess-cavity and its lumen was detectable. The ovary contained a single-celled abscess, one and one-sixteenth of an inch thick on one side, with a firm dense, outer coat, and one-fourth inch thick on the other side, with firm, dense tissue making up most of its thickness. The inner surface was covered with soft, fibrinous exudate, which, upon removal, revealed small hemorrhagic areas scattered throughout the inner layer of the wall.

Bacteriological examination. Cover-slip preparations from the pus stained with aniline water solution of gentian-violet showed very numerous lance-shaped cocci arranged in single pairs and short chains of from two to four pairs. Preparations treated by Welch's method demonstrated well-developed capsules about the cocci. They stained by Gram's method. No other bacteria could be found in the cover-slip preparations.

Cultures made from the pus immediately after the operation on faintly alkaline glycerin agar-agar (5 per cent.), after twenty-four hours at 37° C. gave a growth of fine white colonies. This proved to be a pure culture of lance-shaped cocci arranged in single pairs or short chains. They stained by the aniline water solution of gentian-violet, and were also stained by Gram's method. No capsules were present in the cultures. A rabbit was inoculated subcutaneously with one-half c.cm. of a twenty-four hours' old glycerin bouillon culture. It was sick for twenty-four hours, and recovered.

In sections of the abscess-wall hardened in alcohol and stained by Weigert's method abundant fibrin was seen on the inner side of the section, with a few diplococci scattered through it. Sections stained with hæmatoxylin and eosin showed the entire wall to be very vascular, the vessels throughout being large and distended with blood. No Graafian follicles were seen. The outer two-thirds of the section consisted of mature fibrous tissue with some round-cell infiltration in areas. The inner third has the general appearance of very vascular granulation-tissue with areas of hemorrhage. It contains very numerous distended vessels. There are many hemorrhagic areas, in some the blood-cells being well preserved, in others being replaced largely by *débris* and pigment. Throughout this layer is an abundant small-cell infiltration. In a few places are seen large uninuclear polygonal cells, some of them appearing uniformly pale yellow, with faintly staining nuclei.

Case III.—Mrs. C., aged fifty-three years, still menstruating, has complained of pain in her left iliac region since 1889. A satisfactory history of this case of ovarian abscess could not be obtained. At the time of her operation she was experiencing menstrual irregularities in the way of menorrhagias. Has not been pregnant for twenty-six years. Never had any pulmonary disease.

Examination revealed an immobile uterus and a mass in the left iliac region, tender and fixed, pushing the uterus over into the right side of the pelvis.

Operation, May 22, 1895. Upon opening the abdomen the left ovary containing an abscess was removed. A subperitoneal pedunculated fibroid as large as an English hickory-nut was removed from between the folds of the right broad ligament. Two hysterorrhaphy-stitches were used and the patient put to bed in good condition.

Her recovery was entirely satisfactory, and she left the hospital in four weeks.

Examination of the specimen. There were abundant general torn adhesions over the surface of the ovary and the tube. The tube was connected to the ovary by bands of adhesions, but was not intimately attached to it. Its abdominal end was patent, the tube was not dilated, contained no pus, and presented only signs of chronic catarrh. No connection between the lumen of the tube and the abscess-cavity could be made out. In the ovary was a single abscess one inch in diameter, containing two or three drachms of thick, yellow, very viscid pus. The abscess was surrounded by a wall one-fourth of an inch thick on all sides, externally being dense and fibrous, and internally presenting a lining of soft, friable material. The opposite tube and ovary were normal.

Bacteriological examination. Cover-slip preparations from the pus stained with aniline water gentian-violet solution showed abundant lance-shaped cocci arranged in single pairs or short chains. Preparations treated by Welch's method showed them to be surrounded by fairly well-developed capsules. They were stained by Gram's method. No other bacteria were found.

Cultures from the pus on neutral glycerin agar-agar remained sterile. Those made on Löffler's blood-serum mixture after twenty-four hours at 37° C. gave a delicate white growth, which proved to be a pure culture of cocci arranged in single pairs or short chains, staining by Gram's method. There were no capsules in the cultures. No growth occurred at room-temperature. No animal inoculations were made.

Sections of the abscess-wall, hardened in alcohol and stained by Gram's method, revealed abundant diplococci, mostly in single pairs or short chains, near the inner surface, and only a few deeper in the sections. Sections stained with hæmatoxylin and eosin were as follows: The outer two-thirds of the section were made up of irregularly arranged fibrous tissue. No Graafian follicles were seen. The inner third showed very dense infiltration with multinuclear leucocytes, with areas of marked nuclear fragmentation and some of entire necrosis. The vessels were few and not prominent, and there were no areas of hemorrhage. In the inner portion of the section were larger, unicellular polygonal cells, either single or in groups.

Remarks. Two conditions are marked in these three cases. The first is the severe inflammatory invasion of the peritoneum as shown by the abundant adhesions. The second is in the macroscopic character of the pus, which was thick and very tenacious, resembling that seen in cases of empyema following lobar pneumonia caused by the *micrococcus lanceolatus*.

In each case the pus was literally loaded with cocci, while the sections of the abscess-walls showed only a very few. The large polygonal cells seen in the sections correspond to those represented in the drawings by Langer,[8] and considered by him as "luteal" cells.

Zweifel,[17] Frommel,[15] and Witte[16] report bacteriological examinations of 376 cases of pyosalpinx. In all of this large number of cases there were only seven instances where the *micrococcus lanceolatus* was found. In these cases there were abdominal pains, fever with chills, and nausea. In only one case (Frommel[5]) was there antecedent lung-affection, which was probably tubercular. In five of these cases the coccus existed in pure cultures, and in two it was associated with the staphylococcus and different bacilli. In all of them there were recent and old adhesions binding the tube to adjacent structures. The anamnesis is like that of puerperal sepsis and gonorrhœal salpingitis.

Martin[3] suggests a possible diagnosis of pelvic abscess from the micrococcus lanceolatus by excluding, in the antecedent history, labor at term or interrupted, and gonorrhœal infection, and by the evident presence of severe perimetritis. It may be added also that he cautions particularly against infecting the peritoneum and abdominal wall with such pus during the operation, because of two fatal cases reported by Frommel and Witte.

Two additional points of interest in this form of abscess arrest our attention, viz., first, the route by which the pneumococcus reached the ovary; and, second, the point of structure of the ovary, which is its primary localization. The solution of these two questions is uncertain, because they may differ in different cases.

First, the route of invasion may be by (*a*) the external genital passages; (*b*) the intestines; (*c*) the general circulation.

a. Weickselbaum[14] has observed the pneumococcus as a cause of endometritis and salpingitis. It is found in the diseased human vagina, never in the normal vagina, because it is not possible for pathogenic bacteria to exist in a normal acid vaginal secretion (Döderlein[4]). Thus it will be seen that in the condition of the vagina altered by local disease-processes the pneumococcus can reach the ovary from this tract by traversing the uterus and Fallopian tubes.

Poirier[11] has shown that the lymphatic vessels of the uterus connect with those of the tube and ovary near the ovary, thus supplying a possible route to the ovary along which infection can pass from the vagina.

b. Tubercular invasion of the tubes has been observed in women with intestinal tuberculosis (Jans[7]). Similarly, the pneumococcus which is almost constantly found in the human intestine (Stoecklin[13]) may escape from the intestine, where lesions of its mucous membrane exist, and gravitate to the pelvis, and thus reach the ovary. Illustrative of this point, Pinner[10] introduced dust into the peritoneal cavity of dogs and rabbits, and it soon made its appearance in the tubes, uterus, and vagina. Reaching the pelvis in this manner, at the time of the rupture of a Graafian follicle, it could easily find a favorable localization in the cortex of the ovary. Confirmatory of this fact, that the pneumococcus invades the peritoneal cavity from the intestines, Barbacci[1] states that he found the *micrococcus lanceolatus* in 60 per cent. of cases of perforative peritonitis, and Wilson[15] found it in the exudate of appendicitis. Grawitz[6] has shown experimentally that a considerable number of pyogenic bacteria may be introduced into the peritoneal cavity without causing peritonitis, provided the peritoneum be healthy and the wound not infected. Therefore, it can be seen that it is possible for the pneumococcus escaping from the intestine into a healthy peritoneal cavity to gravitate to the pelvis and infect an ovary presenting a suitable point of invasion, like a ruptured Graafian follicle, as the seat of primary invasion of the pyogenic bacterium, because the resultant abscess-wall contained large luteal cells and because it was lined with a yellowish, crumbling, necrotic mass of tissue. Indeed, Corvill[3] and Terillon have described pus-accumulations of considerable size in Graafian follicles. Reinstein[12] and Coe[2] believe that ovarian abscesses may begin as an infection of Graafian follicles.

c. The route of invasion by the circulation. Transmission of the germs of disease by this means is a well-known fact. By it any organ or tissue can be invaded. Capillary infarcts occur at any point in the capillary system, and when the circumstances are favorable the development of this secondary infection progresses in accordance with the natural history of the germs contained in the thrombic mass. An ovarian abscess, developing from this cause, will naturally be expected to have its seat in the parenchyma, and not in the cortex of the organ. There-

fore, the structure of the abscess-wall would be likely to determine whether an ovarian abscess arose from the Graafian follicle, which is seated partially within the cortex of the ovary, or from the parenchyma of this organ. If the point of infection was a Graafian follicle, the pyogenic wall would contain cells characteristic of that follicle, *i. e.*, luteal cells. If it arose from the parenchyma, there would be an absence of such cells.

In these three abscesses we find the abscess-walls containing these peculiar bodies in the second and third cases, but not in the first one. If, therefore, the premises be correct concerning the histological elements of the abscess-wall in these cases, the deduction that the first case of infection of the ovary must have been through the general circulation, and that of the second and third cases through ruptured Graafian follicles, would seem to be tenable.

Bibliography.

1. *Barbacci:* Centralb. f. Allegemeine Path., u. path. Anatomy, Oct. 1893.
2. *Coe:* American Journal of Obstetrics, 1891, p. 728.
3. *Cornil et Terillon:* Arch. de Phys. norm. et path., Paris, 1887, x.
4. *Doederlein:* Deutsch. med. Woch., 1895, No. 10, p. 157.
5. *Frommel:* Centralblatt f. Gynäcol., 1892, No. 11, p. 205.
6. *Grawitz:* Virchow's Archiv, Bd. 108, Bd. 110, Bd. 116.
7. *Jans:* Virchow's Archiv, 1886, Bd. 103, p. 522.
8. *Langer, A.:* Archiv f. Gynäcol., 1895, xlix. Heft 1, p. 87.
9. *Martin, A.:* Die Krankheiten der Eileiter, 1895, Leipzig.
10. *Pinner:* Archiv f. Anat. u. Phys., physiolog. Abth., 1880, p. 241.
11. *Poirier, P.:* Publications du Progrès Médical, Paris, 1890.
12. *Reinstein:* Archiv f. Gynäcol., 1890, Bd. 39.
13. *Stoecklin:* Annales Suisses des Sciences Médicales, 1894, Serie, i. 1, 6.
14. *Weickselbaum:* Wiener med. Woch., 1888, No. 31.
15. *Wilson, E. H.:* Annals of Surgery, April, 1894, p. 479.
16. *Witte, E.:* Zeitschrift f. Geburtshulfe u. Gynäcol., 1893, Bd. 25, p. 1.
17. *Zweifel:* Archiv f. Gynäcol., 1891, Bd. 39, p. 352.

DIPHTHERITIC HEMIPLEGIA.

By John Jenks Thomas, M.A., M.D.,

physician to the boston dispensary; assistant to the physicians for diseases of the nervous system, boston city hospital; member of the american neurological association; fellow of the massachusetts medical society, etc.

Diphtheritic paralyses have been the subject of much research, and much has been written upon them since they were first carefully described, about the middle of the century. Although many things that are peculiar to this form of paralysis remain unexplained, and writers are still divided as to the nature of the lesions, yet since the work of Charcot and Vulpian, who, in 1862,[1] found granular and fatty degenerations

[1] Charcot Vulpian: Gazette médicale, 1863.

of the fibres of the palatine nerves, the more commonly accepted view has been that the process is essentially a peripheral one. Among those who have found lesions of the peripheral nerves besides Charcot and Vulpian are Loraine and Lepine,[1] who also found diseases of the nerves of the palate; Lionville,[2] who found the phrenic nerve affected; Schech,[3] of the recurrent laryngeal nerve; and P. Meyer,[4] who found both parenchymatous and interstitial neuritis; and in some nerves also a neuritis nodosa. Mendel[5] takes the same view, but also found small hemorrhagic infiltrations in various portions of the nervous system.

More or less opposed to these views are those of such men as Dejerine,[6] who holds that the lesions are inflammatory processes, and small hemorrhages in the spinal cord. He found[7] changes also in the cells of the anterior horn of the cord, which he thought comparable to those of anterior poliomyelitis. Although he found proliferation of the nuclei in the sheath of Schwann and drops of myelin, and a loss of the axis-cylinders, he considered these changes secondary. Vulpian[8] also found changes in the cord, but considered them of secondary importance. Kidd[9] ascribes diphtheritic paralyses to changes in the anterior horns of the cord. Buhl[10] found capillary hemorrhages in the brain, in the spinal nerve roots, and in the spinal ganglia, and also calls attention to the changes in the vessels in diphtheria.[11] P. Meyer[12] found, besides the marked peripheral changes extending to the finest end branches of the nerves, also small hemorrhages in the cord.

Oertel[13] found, besides degeneration of the muscles, a fact of importance in connection with thrombosis in the heart in diphtheria, also both large and small hemorrhages. Klebs[14] found small capillary extravasations in the pia of the cerebrum, especially upon the convexity, and occasional greater infiltrations, especially along the course of the sulci, in the ascending frontal convolution, the frontal and the temporal lobes. He also found bacteria, similar to those in the throat, in these hemorrhages. Krauss[15] found normal nerve-nuclei, a degeneration of the peripheral portion of the oculo-motor nerve, and a diapedesis of red corpuscles

[1] Article on Diphtheria in the Nouveau dictionnaire pratique.
[2] Bulletins de la Société Anat., 1870.
[3] Schech: Laryngologische Mittheilungen. Archiv für klinische Medicin, Bd. xxiii.
[4] P. Meyer: Anatomische Untersuchungen über diphtheritische Lähmungen. Virchow's Archiv., Band lxxxv. p. 181.
[5] Mendel: Zur Lehre von den diphtheritischen Lähmungen. Neurolog. Centralblatt, 1885, p. 128.
[6] Archives de Physiologie normal et pathologique, 1878, p. 107.
[7] Dejerine: Comp. rend., lxxxv. No. 24.
[8] Maladies du système nerveux, 1877.
[9] Lancet, Jan. 13, 1883.
[10] Zeitschrift für Biologie, 1867, p. 341.
[11] Loc. cit., p. 359.
[12] Loc. cit., p. 214.
[13] Ziemmsen: Handbuch, ii. 2te. Auflage, 1876, p. 608 and p. 638.
[14] Eulenburg's Realencyklopädie, 1 Auflage, Bd. iv. p. 167.
[15] Neurolog. Centralblatt, 1888, p. 480.

with greater and smaller hemorrhages throughout the brain. Arnheim[1] found (1) hyperæmia and capillary hemorrhages in the peripheral nerves; (2) slight inflammatory processes in the muscles; (3) severe parenchymatous and interstitial degeneration of the nerve-fibres; (4) no changes in the ganglion-cells; (5) no systemic disease of the cord. Mendel[2] found (1) capillary hemorrhages in the central nervous system, and also in the peripheral nerves; (2) signs of interstitial and parenchymatous neuritis in the form of nuclear proliferation of the neurolemma, and alterations of the medullary sheaths. He says: "Therefore I am inclined to think that the diphtheritic poison attacks the vessel-walls as well as the neurolemma, and indeed at the same time in certain cases, and that the advocates of poliomyelitic, and neuritic changes exclusively, as the basis of the diphtheritic paralyses, may be just as far from the right as those who refer everything to thrombosis and hemorrhages—that is, to changes of the vessel-walls." Recently Bikeles[3] describes small black flakes in the cord, most numerous in the posterior columns (Würzelzone), to which he ascribes the ataxia. Enriquez and Hallion[4] found that the toxins of diphtheria injected under the skin of dogs may cause, if the dose is not too large, intense congestion of the gray matter of the cord, with hemorrhages and foci of inflammation, characterized by formative irritation of the neuroglia. J. J. Putnam[5] says that of the post-infection disorders of the nervous system none are so common as neuritis, and he distinguishes three varieties: (1) The neuritis attending the first stage of an infective process before there has been time for the development of general disorders of nutrition; (2) The post-infectious neuritis, in the production of which general disorders of nutrition and a variety of other causes play an important part; (3) The acute, usually fatal, and hemorrhagic neuritis of unknown origin. "Finally," he says, "it should not be forgotten that what we have considered as neuritis is often associated with nuclear and diffuse spinal lesions, and that better methods of investigation may show these to play a more important part in the production of symptoms and nerve-lesions than has hitherto been supposed." Hochhaus[6] thinks that the cause of diphtheritic paralysis may be situated in the muscles. Besides a slight interstitial neuritis he found always a severe inflammation of the muscles. Cramer[7] thinks that the changes in the nerve are

[1] Anatomische Untersuchungen über diph. Lähmungen. Archiv für Kinderheilkunde, Bd. xiii. [2] Loc. cit., p. 133.

[3] Bikeles: Zur pathologischen Anatomie der post-diphtheritischen Lähmung. Arbeiten aus dem Institut für Anatomie und Physiologie des Central-nervensystems an der Wiener Universität. H. Obersteiner, Heft 2, Wien, 1894.

[4] Soc. de Biologie, April 14, 1894.

[5] J. J. Putnam: Relation of Infectious Processes to Diseases of the Nervous System. THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, March, 1895.

[6] Ueber diphtheritische Lähmungen. Virchow's Archiv, Bd. cxxiv. p. 2.

[7] Cramer: Aetiologie und pathologische Anatomie der eripheren Neuritis. Centralblatt für allg. Pathologie und path. Anatomie, Dec. 1893.

primarily vascular and interstitial. Gowers[1] classifies the paralyses of diphtheria under the form of secondary toxæmic neuritis, in which the toxæmic agent first causes some definite disease, which is followed by neuritis, which is probably generally due to some chemical product of the growth of the organisms in the body. He also says:[2] "Diphtheria may cause acute changes in the nerve-cells and nerve-roots." He also describes the lesions found in the peripheral nerves as primarily parenchymatous, and says:[3] "There is not, as a rule, any inflammatory change in the interstitial tissue of the nerves, and the primitive sheath is generally unchanged." He also speaks of the "parenchymatous and interstitial inflammation and degeneration" of the muscles, and of the frequence with which small hemorrhages have been found throughout the nervous system. Pierret[4] found meningitis in one case, as did also Dejerine and Barth.[5]

Thus we see that the pathological changes produced in the nervous system by diphtheria are not confined to a single definite variety of lesion. The cases of meningitis are probably due to secondary infection of the meninges, sometimes with the Klebs-Löffler bacillus, at other times with some of the other varieties of bacteria so often associated with this bacillus in the disease. The first, however, is not at all improbable, considering the frequency with which this bacillus has been found by Wright[6] in the various internal organs, and in the blood from the heart, in cases dying from diphtheria. Again, certain permanent paralyses,[7] occurring after diphtheria, as the rapid paralysis of one cranial nerve and the progressive ophthalmoplegias and paralyses of other cranial nerves, are probably nuclear in origin, the result of acute or chronic nuclear changes, sometimes inflammatory, at other times due to small hemorrhages, which we have so repeatedly found mentioned among the pathological changes.

The flaccid form of the ordinary diphtheritic paralyses, the condition of the electrical reactions in them, and the almost invariable recovery from them, all point to the lesion being one of the peripheral neuron. Whether the change is of the nature of a parenchymatous or an interstitial inflammation is harder to decide. We can, however, assume that the nutrition of the cell suffers from the presence of toxic products, probably chemical, in the blood, produced during the course of the disease, either by the micro-organism causing the disease, or by the body itself, acting under the stimulus of these micro-organisms or their products. As the axis-cylinder is but the prolongation of the nerve-cell, it is not

[1] Gowers: Diseases of the Nervous System. 2d ed., vol. i. p. 112.
[2] Loc. cit., p. 235.
[3] Loc. cit., vol. ii. p. 913.
[4] Gazette des hôpitaux, 1877, p. 13.
[5] Archives de physiologie, 1880.
[6] J. H. Wright: Studies in the Pathology of Diphtheria. Boston Medical and Surgical Journal, Oct. 4 and 11, 1894.
[7] See Gowers: Diseases of the Nervous System, vol. ii. p. 909.

surprising that changes are described as found in the cells of the cord at times, since the nerve-cell of the peripheral neuron in the cord may easily suffer with its process, though the changes are not those of an anterior poliomyelitis, as Dejerine thought. To be sure, certain facts are difficult to explain as resulting from a simple peripheral neuritis. Such as, for example, that the palate so often suffers alone, or that accommodation is affected without the involvement of other ocular muscles, while we should expect a toxic substance circulating in the blood to affect all nerves in approximately the same degree. To discuss these questions would take us too far from the subject of this paper, but the case of Kussmaul, quoted by Meyer,[1] is of sufficient interest to note here. In this case a newborn baby was attacked by diphtheria of the navel, and in consequence a paralysis of the abdominal muscles followed. This case seems to show that there is some influence from the proximity to the point of production of the poisonous substances produced during the course of the disease, perhaps upon the finer nerve-endings, which were indeed found affected in this case.

That cases of paralysis due to disease of the peripheral neuron, a peripheral neuritis, are not the only form of paralysis from diphtheria we have already seen in the case of the nuclear affections just mentioned. Besides these we find disease of the cord, and of the cord and brain combined, as in the cases of multiple sclerosis which have been reported.[2]

We find, in addition to these unusual forms of disease of the nervous system from diphtheria, still another form of paralysis. In the course of this disease we find a paralysis of the hemiplegic type, occurring suddenly, indicating a vascular lesion within the brain itself, caused by embolism, thrombosis, or hemorrhage. In the first cause we have to do with an embolus, carried from a clot formed in the heart, and lodging in one of the cerebral vessels. This is the direct result of the effect of the diphtheritic poison upon the muscle of the heart-wall, which has long been known and carefully studied. Leyden[3] found an interstitial myocarditis, and Mosler,[4] Oertel,[5] Rosenbach,[6] Birch-Hirschfeld,[7] Schemm,[8] and Unruh[9] have all described changes in the hearts of patients dying of diphtheria. Embolism from a heart-thrombus is known to occur in other marantic diseases, as typhoid fever, purpura, measles, scarlet fever, and epidemic cerebro-spinal meningitis.

[1] Loc. cit., p. 214.

[2] A. Schönfeldt: Ueber multiple Hirn-Rückenmarksclerose nebst Angabe zweier Fälle bei Kindern nach Diphtherie. Inaug. Dissert., Berlin, 1888.

[3] Zeitschrift für klinische Medicin., Bd. iv. 1882.

[4] Archiv der Heilkunde, 1873, xiv.

[5] Deutsches Archiv für klinische Medicin, 1871, viii.

[6] Virchow's Archiv, Bd. lxx] 352.

[7] Jarhresbericht der Gesellschaft für Natur. und Heilkunde, Dresden, 1879.

[8] Virchow's Archiv, Bd. cxxi. p. 235.

[9] Jahrbuch für Kinderheilkunde, Neue Folge, Bd. xx.

In the case of thrombosis in a cerebral vessel, which is not secondary to an embolus, we may have either a plugging of the vessels by bacteria in the blood-current, or the effect, direct or indirect, of the disease upon the vessel-walls, aided in most cases by the slowing of the blood-current, because of the affection of the heart.

Lastly, we have the cases of hemorrhage. The frequency with which, as we have seen, capillary hemorrhages have been found throughout the whole central nervous system points to a diapedesis of blood-corpuscles and an increased permeability of the vessel-walls, produced by the poison of the disease or by the direct action of the bacteria themselves, which we may infer both from the fact that they have been found within these small hemorrhages, and from the frequency with which they have been found in other organs of the body.[1] Auerbach[2] calls attention also to the increased blood-tension from the complicating nephritis so often occurring, as a condition favoring hemorrhage. Apolant[3] takes the ground that these small hemorrhages are the essential factor in the ordinary forms of paralysis from diphtheria, and that the hemiplegic form differs therefore from the other forms of paralysis quantitatively only, and not qualitatively. Certainly the hemorrhages large and small are produced directly by the poison of the disease within the body, and so should be considered as due to the disease itself. In like manner the changes in the peripheral nerves, which are the cause of the ordinary forms of diphtheritic paralysis, are produced directly by the disease, though not by the micro-organisms of the disease directly, as, indeed, in all probability, is the case with most of the symptoms of the disease. Therefore we are justified in speaking of diphtheritic paralysis and also of diphtheritic hemiplegia, as the element of time in the sequence of direct results of the disease, which constitutes the chief distinction in this case, is of minor importance.

Thus while the lesion producing these hemiplegias is the same as that in adult hemiplegias, yet they are so directly the result of the disease that it seems to me to be better to emphasize this difference by the use of a distinctive name. One writer, in reporting a case of this kind, calls it a cerebral palsy of childhood following diphtheria, although he does not discuss the pathological basis of the hemiplegia. I must dissent most decidedly from the use of such a name, because of the confusion which would result if such a designation should come into general use. In the large majority of the cases of the spastic cerebral hemiplegia of childhood we find the lesion in the cortex, most of them probably due to a meningeal hemorrhage, or an inflammatory process of the cortex, resulting in sclerosis, or the condition termed porencepha-

[1] Wright: loc. cit.
[2] Deutsche medicinische Wochenschrift, 1892, xviii. p. 168.
[3] Hemiplegie nach Diphtheritis. Inaug. Dissert., Berlin, 1894.

litis by Strümpell, and thus differing most decidedly from the cases we are now considering, which are usually due to a lesion of the internal capsule, except, perhaps, in the remarkable case of Gnauck,[1] where there undoubtedly existed a cerebral lesion of uncertain location, but very probably in the basal ganglia, indirectly involving the pyramidal fibres in the internal capsule for a time only.

Cases of diphtheritic hemiplegia are rare, and most of the text-books upon nervous diseases, as well as those upon children's diseases and general medicine, are entirely silent upon the subject. Gowers[2] says: "In the course of this (diphtheria), as in most other acute specific diseases, sudden hemiplegia may indicate the occurrence of a vascular lesion of the brain, either thrombosis, embolism, or a hemorrhage. Death may result. The paralysis is often permanent." Von Ziemssen[3] says: "Nevertheless rare exceptional cases do occur, which offer difficulties in diagnosis, such as those which arise after slight preceding symptoms, with hemiplegias and monoplegias, ushered in by apoplectic attacks. Such cases are, however, in contradistinction to the typical picture of diphtheritic paralysis, the greatest rarities, and will scarcely come to the observation of even very experienced physicians." Henoch[4] mentions three cases in which he saw hemiplegia come on after diphtheria. One case ended in death, where the autopsy showed embolism of the artery of the fossa of Sylvius. Prof. Bókai, of the Stephanie Kinderhospital in Buda-Pest,[5] says that in this hospital since 1874 he has seen four cases of post-diphtheritic hemiplegia. Hirt,[6] in speaking of cerebral hemorrhage, says: "Exceptionally hemiplegia occurs after diphtheria, sometimes in conjunction with a paralysis of the palate, sometimes independently." Dillon Brown[7] says: "The paralysis of diphtheria may be divided into two classes: first, a true multiple neuritis, and, second, other types of paralysis as a result of hemorrhages or degenerative changes in the brain or spinal cord." Bernhardt[8] says that cerebral hemiplegia after diphtheria is very rare. Monti[9] says: "Generally the diphtheritic paralysis is symmetrical, only exceptionally does one observe the hemiplegic form." Eichhorst[10] says that rarely there occur in diphtheria hemiplegias of cerebral character, and that they are sometimes accompanied by aphasic disturbances. Sanné says:[11] "The paralysis is ordinarily symmetrical.

[1] Centralblatt für Nervenheilkunde, 1891, p. 343.
[2] Loc. cit., vol. ii. p. 909.
[3] Klinische Vorträge. 6. Vortrag. iv. Nervensystem, 1. Ueber diphtheritische Lähmungen und deren Behandlung, p. 22.
[4] Vorlesungen über Kinderkrankheiten, 6te. Auflage, pp. 742, 751, 764.
[5] Orvosi Hetilop. No 24, quoted by Donath: Neurolog. Centralblatt, 1893, xii. p. 481.
[6] Diseases of the Nervous System. English translation of Hoch and Smith. Appleton, 1893, p. 219.
[7] In Louis Starr's American Text-Book of the Diseases of Children, 1893, p. 182.
[8] Berliner klinische Wochenschrift, 1886, p. 538.
[9] Eulenburg's Realencyclopädie, 2te. Auflage, Bd. v. p. 407.
[10] Handbuch der speciellen Pathologie und Therapie, 4te. Auflage, Bd. iv. p. 671.
[11] Traité de la diphthérie, Paris, 1877, p. 157.

It assumes very rarely the hemiplegic form. I have, for my part, met one case of right hemiplegia." Mendel[1] says that he has seen three cases. Wallenberg,[2] in 160 cases of hemiplegia, found 9 after measles, 13 after scarlet fever, and 6 after epidemic cerebro-spinal meningitis. Of Osler's 120 cases none followed diphtheria.

The reported cases of diphtheritic hemiplegia which I have been able to collect from the literature are twenty-eight in number.

Duchenne[3] mentions a case of diphtheria in which paralysis of the palate followed, where there came on suddenly in the middle of the convalescence, a diplegia lasting one hour, and thereafter a complete left-sided hemiplegia.

Henoch, at the Gesellschaft der Charite-Aertze in Berlin, at the meeting of February 11, 1886,[4] described one case which he had seen in a nine-and-one-half-year-old girl, who was taken with diphtheria on November 21st. On November 27th she was admitted to the hospital, and tracheotomy was performed. She had considerable albuminuria, which gradually diminished, with the improvement of the general condition. On the tenth day of the disease paralysis of the palate appeared. On the sixteenth day she was very weak, with a very slow pulse (52), which was small and irregular, and she had attacks of syncope. At this time there was very little albumin in the urine. She was unable to swallow and vomited. The respiration was 68; she had dyspnœa and tracheal râles. The pulse was 120. Beginning with the twenty-fifth day the respiration improved, until on the thirty-fourth day it was normal in frequency. The albumin was gone from the urine. On the forty-first day she had a sudden attack of paralysis of the left extremities and of the left side of the face, while the tongue deviated to the left. This condition lasted ten days. Then the hemiparesis disappeared gradually, and the improvement continued rapidly. At first the movements of the extremities were plainly ataxic. This also disappeared, as did the paralysis of the palate. The knee-jerks were absent on both sides. The patient recovered completely. Henoch thought the paralysis was due to embolic thrombosis.

Henoch then mentioned another previous case, where left-sided hemiplegia appeared in a nine-year-old girl after a severe attack of diphtheria. At the autopsy there was found a complete occlusion by thrombosis of the right Sylvian artery, without alterations having as yet appeared in the structure of the brain.

Henoch mentions a third case in his *Vorlesungen über Kinderkrankheiten*.[5] In this case, six weeks after the beginning of the diphtheria, when the patient was feeling quite well, there came on suddenly a right hemiplegia, which was not preceded by any paralysis of the palate.

In the discussion, at the meeting of the Gesellschaft der Charite-Aerzte, which followed Henoch's report of these cases, Senator[6] mentioned, without giving details, that he had seen a case of well-marked left hemiparesis in a girl of fifteen years, who had had diphtheria at the age

[1] Zur Lehre von den diphtheritischen Lähmungen. Neurolog. Centralblatt, 1885, p. 133.
[2] Quoted by Sharples, Medical News, Philadelphia, Aug. 4, 1894.
[3] Bull. de Thér., lxxviii. fév. 28.
[4] Berliner klinische Wochenschrift, 1886, p. 538.
[5] 7te. Auflage, p. 759.
[6] Berliner klinische Wochenschrift, pp. 886, 1539.

of four years. He states that the hemiparesis was cerebral, but without contractures, and with atrophy.

Sanné[1] says: "I have for my part met one case of right hemiplegia," but gives no details.

Prof. Bókai, of Buda-Pest,[2] as has been said above, has seen four cases of diphtheritic hemiplegia since the year 1874. One case was in a boy of thirteen years, who had a complete right-sided hemiplegia, with involvement of the face and aphasia. In the other three cases there was once a right-sided paralysis of the face and aphasia, while in the second and third cases there was once a paralysis of the right and once of the left extremities. Bókai ascribed these cases to embolism of the artery of the fossa of Sylvius, due to a marasmic heart-thrombus.

Hirt[3] says: "In a girl, aged fifteen years, under my care, hemiplegia developed fourteen days after diphtheria, without any simultaneous disturbance of consciousness, and only slight improvement was noticed after several years."

Mendel[4] states that he has seen three cases of hemiplegia after diphtheria, two of which died. One case lived, but remained hemiplegic, and contractures developed. In all three cases there was a hemiplegia involving the lower portion of the face, the arm, and the leg, without disturbance of sensation, twice on the right and once on the left side. It came on suddenly, without marked disturbance of consciousness. One case came to autopsy, when there was found a hemorrhage the size of a cherry-stone into the inner portion of the lenticular nucleus, which had destroyed a part of the neighboring inner capsule.

In the discussion of this paper Prof. Remak[5] mentioned two cases of the same affection.

One was the case of a seven-year-old girl, who had an attack of loss of consciousness, followed by right hemiplegia, with transitory aphasia. The other case was one of left-sided spastic hemiplegia in a boy of eight years.

Solbrig[6] reports another case. E. E., four years of age, was admitted to the hospital on May 15, 1884. She had been ill with diphtheria from the 14th of April until the 1st of May. Three weeks previous to admission she had been attacked by right-sided paralysis without loss of consciousness or convulsions. At the time of admission there was paralysis of the lower portion of the right side of the face, the head was bent to the left, and the chin turned toward the right. There was also paralysis of the right upper and right lower extremities, which could not be moved at all. There was paralysis of accommodation and of the palate. The knee-jerks were absent. There was aphasia. Sensation was not affected. On June 10th the patient could speak, and there was right convergent strabismus. On August 5th the paralysis of the face was gone. The extremities were still affected. There was paralysis of the thumb-muscles and of the right peronei. The remainder of the muscles of the right extremities were still paretic. The speech was normal. The knee-jerk was absent on both sides. The paralysis of the palate, of accommodation, and the strabismus were gone. On May 5,

[1] Loc. cit., p. 157.
[2] Loc. cit.
[3] Loc. cit., p. 219.
[4] Loc. cit.
[5] Berliner klinische Wochenschrift, 1885, No. 13, p. 203.
[6] Otto Solbrig: Ueber nervöse Störungen nach Diphtherie. Inaug. Dissert., Berlin, 1886.

1885, there was still some paralysis in the region of the facial nerve, and the uvula was drawn down to the right side. Speech was normal. Contractures had formed in the muscles of the forearm. Active motion was retained in part—almost completely in the right foot. The knee-jerk on the right was increased. There were contractures in the muscles of the right leg, so that pes equinus had resulted.

Bouchut[1] reports a case of diphtheria where suddenly, during the night, right hemiplegia came on. There was paralysis of the palate, a "congestive neuritis" in the right eye, embolism of the superior branch of the central artery, and in the left eye optic atrophy. The heart was normal. The author seems uncertain as to the cause, but certainly embolism seems the most probable one.

Another case of hemiplegia from diphtheria is reported by Jäckle.[2]

G. A., five and one-half years old, was taken ill in March, 1891, with diphtheria. He became free from fever on the fifth day. On the eighth day the membrane was gone. The heart and lungs were normal. On the ninth day œdema of the face was noticed, and the next day of the legs. At that time there was albumin in the urine. The patient was apathetic, and vomited at times. The speech was nasal, but there was no difficulty in swallowing. On the twelfth day the patient had clonic and tonic convulsions, which were repeated several times. There was loss of consciousness. The feces and urine were retained. The pulse was 112, and hard in character. On the fourteenth day there had been no more convulsions, and the mind was clear, but there was now paralysis of the right side of the body, and the mouth was drawn to the left. The pupils reacted slowly, but were equal. Sensation was not disturbed. There was complete aphasia. Both knee-jerks were weak. The urine and feces were retained. The urine, which was drawn by a catheter, contained much albumin, epithelial casts, and epithelium. The condition remained practically the same until the end of the fourth week. Then the urine still contained a trace of albumin. The speech was better. The knee-jerks were normal. The paralysis was still unchanged. The faradic excitability of the nerves of the right side was somewhat diminished. At the beginning of the eighth week the ataxia and Romberg's symptom were still present, yet the patient could take a few steps. In the twelfth week the gait was better, though the right leg was still dragged. The arm had not improved so rapidly, but it could then be raised to the horizontal and feebly flexed at the elbow. The hand was held clinched and flexed at the wrist. The lower extremity became gradually quite capable of doing its work again, but motion of the arm remained impaired. The corner of the mouth was drawn somewhat to the left. The speech was normal. The author concludes that the cause of the hemiplegia was a hemorrhage into the posterior limb of the inner capsule.

Auerbach[3] reports a case of diphtheritic hemiplegia from the hospital at Frankfort-on-the-Main.

[1] Hemiplégie diphthéritique droite. Cérébroscopie. Atrophie papillaire et embolie dans l'œil gauche; névrite congestive de la papille droite. Gaz. des hôpitaux, Paris, 1869, xlii. p. 401.

[2] A. Jäckle: Hemiplegia cerebralis nach Diphtheritis. Aerztliche Mittheilungen aus und für Baden, Mai 13, 1891, 1892, xlvi. p. 75.

[3] Ueber einen Fall von Hemiplegia cerebralis nach Diphtheria. Deutsche medicinische Wochenschrift, 1892, xviii. p. 168.

A. B., seven years old, was taken severely ill with diphtheria. The membrane was gone on the seventh day. On the eighth day there was paralysis of the palate, with nasal speech. There was no anæsthesia of the pharynx, and no paralysis of the constrictors of the pharynx. The urine was normal. On the twelfth day the patient became apathetic and vomited. The urine was cloudy; the amount small (300 c.c.); albumin was present; and many casts were found, which were granular and epithelial. On the fourteenth day œdema of the face was noted. The urine had not changed, but there was less vomiting. The examination of the chest was negative. The paralysis of the palate continued, but the muscles of deglutition remained unaffected. On the twentieth day of the disease, and eight days after the appearance of the nephritis, there came on tonic and clonic spasms of the whole body, of ten minutes' duration. The pulse was 120, and of high tension. The temperature was normal. The patient was unconscious, and this lasted throughout the night. There was no dyspnœa or vomiting. There was almost complete anuria. The mind of the patient was somewhat affected the next day. The muscles of the eyes, including that of accommodation, were not affected. The right corner of the mouth was drawn to the right, while the left cheek and the left side of the chin were motionless. The forehead was not affected. The uvula was drawn somewhat to the right. There was complete motor paralysis of the whole of the left side of the body, while the right side was not affected. Sensation on the left side was normal. There was absence of the knee-jerk and of the abdominal reflex on both sides. There was no difficulty in the speech like aphasia. There was no incontinence of urine or feces. The urine still contained albumin. There was no vomiting. On the twenty-third day there appeared moderate ascites, double hydrothorax, and anasarca. The paralysis remained unaltered. On the twenty-fifth day the œdema and the amount of albumin in the urine had diminished, while the amount of urine had increased. On the twenty-eighth day there was no albumin and no œdema, and the reflexes were normal. The faradic excitability of the nerves of the left arm was a little diminished, otherwise there was nothing abnormal in the electrical reactions. The patient improved from the fourth week. By the beginning of the seventh week she could raise the left leg half as high from the bed as the other leg. One week later she made her first attempt at walking, on which the left leg was dragged. There was then well-marked ataxia, and Romberg's symptom was present. At the time of the patient's discharge the left leg was still dragged in walking, the strength in the left hand was markedly less than in the right, and it was easier to straighten the left arm from the flexed position than the right. The arm could not be flexed and only slightly extended. The fingers could be flexed, or spread, only slightly. There existed some disturbance of co-ordination in the left arm. There was no atrophy. In laughing the mouth was drawn to the right. The organs of sense were normal. The speech was slightly nasal. The intelligence was normal. Three weeks later there was slight atrophy in the left arm. Auerbach thought he had to do with a hemorrhage in the anterior two-thirds of the posterior limb of the inner capsule, and in connection with this an ordinary diphtheritic paralysis. He concludes that it could not have been a case of uræmic hemiplegia, as these are known to be transitory.

Prof. Edgren, of Stockholm, reports another case.[1]

O. L., ten years of age, was taken ill on November 15, 1890, with diphtheria. He was treated in the hospital for one month. During this time he had severe vomiting. About three weeks after the attack he suddenly fell from his seat. Whether he was unconscious or not is not known, nor whether the paralysis came on at once or not. The next day it was noticed that there was paralysis of the right side, with aphasia. The patient remembered that he had had for a short time twitching of the right arm. The patient was taken home on December 17th. He was then very weak, the right corner of the mouth was lower than the left, the right cheek and chin were motionless. The eye-muscles were normal. The right arm and leg could be moved feebly. Except for a few incomprehensible nasal sounds, speech was lost. Fluids came through the nose upon drinking. There was anæsthesia of the right side, which was also colder than the left. There was incontinence of urine and feces. The patient soon became better. At the end of January, 1891, he could walk with help. In February he was able to go out. Speech could be understood, but it remained nasal for many months. The drawing of the mouth to one side gradually lessened, the power of motion returned in the right arm, and the disturbance of the bladder and rectum disappeared. During the spring there was paresis of the accommodation, which was still present in the fall. On January 20, 1892, examination showed the patient of normal size, somewhat thin, and the muscles weak. The urine, the heart, and the lungs were normal. There was a very slight paresis of the lower portion of the right face. The soft palate and uvula moved alike on both sides. The tongue deviated to the left. The patient could walk and run. There was some stiffness of the right leg in walking, the toe was dragged a little, and the foot circumducted at each step. The right extremities were colder than the left. The right hand became blue upon hanging down. There was no atrophy. The reflexes at the elbow in the arms were equal. The knee-jerks were lively, the right more so than the left. Ankle-clonus was present on the right, and the Achilles tendon-jerk was greater on the right than on the left. The cremasteric and abdominal reflexes were equal upon the two sides. Sensation was good on both sides, except that the localizing sense was diminished upon the backs of the fingers of the right hand. The electrical sensibility and excitability were somewhat diminished on the right side, but there were no qualitative changes. At the time of discharge, on March 15th, the patient was almost entirely well. Edgren regarded this as a cerebral case, due to a hemorrhage, which probably affected the inner capsule of the left side. There was no cause for embolism.

Dr. Jones[2] reports a case of diphtheria in a girl, which lasted ten days, in the course of which, or after which—the author does not state the time exactly—a sudden right hemiplegia came on, with involvement of the right side of the face, and ataxic aphasia. There was no loss of consciousness. The sensation was normal. The knee-jerks were weak and equal. There was no pain. The palate was paralyzed. There were no heart-murmurs. Two days later the patient began to move the leg, and motion returned gradually, so that in six weeks she was entirely well.

[1] J. G. Edgren: Ueber einen Fall von halbseitiger Lähmung nach Diphtheria. Deutsche medicinische Wochenschrift, 1893, xix. p. 864.

[2] A. A. Jones: Medical News, Philadelphia, Oct. 22, 1892, p. 417.

Seifert[1] reports two cases. The first was in a girl of ten years, rather weak, not hereditarily affected, but not very well developed mentally. She had always been well. The diphtheritic membrane had disappeared on the eighth day, and there was no more fever. On the tenth day there appeared paralysis of the palate, with nasal voice, and regurgitation of food through the nose. The palate was not moved on phonation. The action of the heart was disturbed, the sounds being quite irregular in rhythm and strength, and later they became very weak and intermittent. The heart was found enlarged, by percussion, as far as to the middle of the sternum. There were no murmurs. Respiration was moderately quickened. The pulse was small, easily compressible, and intermittent. There were no symptoms of kidney-trouble, and there was no albumin in the urine. On the eleventh day the heart-weakness increased, and there were symptoms of collapse. In the following night the patient awoke suddenly with a cry, stared about her, and seemed confused. She was found to have a right hemiplegia. There were no convulsions or twitchings. The right side of the face was affected, except the upper portion. The tongue deviated to the right. The right upper and lower extremities were motionless. The abdominal reflex was absent. There was ataxic aphasia. The patient understood what was said to her, but could not speak. Later she said, "Anne, Anne," to everything. Sensation was normal. The muscles of the eyes, the pupils, and the whole left side were normal. For the next few weeks there was no change in the paralysis or in the condition of the heart. Then there developed a paralysis of deglutition and an anæsthesia of the pharynx. The patient was in great danger till the end of the sixth week. In the seventh week she could swallow better, and the general condition had improved. The power of speech returned gradually, and also motion, first in the leg and later in the arm. By the ninth week she could attempt to walk. During the following weeks motion increased, but there now appeared spasm in the muscles and increased tendon-reflexes on the right. The condition six months later was this: the right side of the face was still paretic, the tongue was protruded straight, the speech was normal, the right arm could be raised vertically, and the elbow moved freely. The hand and fingers were held flexed by contractures, and extension, abduction, and adduction of the wrist and fingers were much limited, but flexion less so. There was slight weakness in the extensors of the right lower leg. The knee-jerk was increased. No clonus. Slight spasm in the leg and more marked spasm in the arm. Sensation was normal, as it had been all along. Seifert regarded embolism as the cause of this hemiplegia, the weakness of the heart having given rise to a thrombus there, which was the cause of the embolism.

The second case which Seifert reports[2] was that of a girl of nine years, who was attacked severely by diphtheria. On the seventh day there was paralysis of the palate. From the fourteenth day there were nephritis, œdema of the face and legs, scanty, cloudy urine, which contained albumin, and numerous granular and epithelial casts. On the twentieth day there were severe headache, vomiting, and apathy. On the next day sudden and complete hemiplegia came on. The patient cried out

[1] P. Seifert: Ueber Zwei Fälle von Hemiplegie cerebralis nach Diphtherie. Neurologisches Centralblatt, 1893, xii. p. 113.

[2] Loc. cit.

several times, became completely unconscious, and this condition lasted the whole day. There were no convulsions. The tongue deviated to the right, and the right side of the face and the right upper and lower extremities were relaxed and paralyzed. The knee-jerk and the abdominal reflex on the right side were absent. There was no disturbance of sensation. The muscles of the eyes and the pupil-reactions were normal. When the patient became conscious, she was found to have complete motor aphasia. She showed by signs that she understood everything, but was unable to speak. The heart and lungs were negative. There was some headache, but no dizziness or vomiting. The condition of the kidneys improved. In the course of the next four weeks there was a return of speech, and of movement in the right leg and later in the right arm. The recovery was slow. It was five months before she was able to walk, and then the right leg was dragged. She could not stand without help. There was limitation of motion in the right shoulder and elbow-joints, and the hand and fingers could not be moved at all, but were held flexed by contractures. There was marked spasm of all the muscles of the paralyzed limbs. The tendon-reflexes were increased. On March 27, 1893, the following condition was found: There was slight weakness in the muscles supplied by the lower branches of the right facial nerve. The tongue did not deviate. Speech was normal. The right arm could be raised vertically, flexion and extension at the elbow were possible. There was only slight motion in the hand and fingers. The contractures in the fingers could be overcome only with difficulty. The right leg was dragged a little in walking, and the gait was paralytic. The right knee-jerk was increased. There was no ankle-clonus. There was a spastic condition of all the muscles of the right leg. Motion at the ankle was limited. The electrical irritability in the paralyzed limbs was slightly diminished, but not changed qualitatively. There were no trophic disturbances, and no anomalies of sensation or co-ordination. In this case Seifert concludes that since the heart was negative, the hemiplegia was due to a hemorrhage which had affected the inner capsule of the left hemisphere.

Another case has been reported by Donath.[1] An eight-year-old peasant boy was taken ill on November 22, 1892, with diphtheria, which lasted fourteen days. On the third day of convalescence he began to go about. There came on that night while he was asleep a complete hemiplegia, with marked involvement of the face, and aphasia, which was complete for fourteen days. The mother said that he could not speak a single word, but understood everything that was said to him. The paralysis of the face improved in three weeks, the aphasia in four weeks. When he began to speak again he was hoarse, probably from a paralysis of the vocal cords. He had no difficulty in swallowing. During the next two months there was no change. The condition on April 22, 1893, was that of a well-developed, moderately nourished, but somewhat anæmic boy, with paralysis of the lower branches of the right facial nerve, and moderately indistinct and drawling speech. The palate could be moved perfectly. The right extremities, especially the upper extremity, were paretic. The upper extremity was held flexed by moderate contractures. The body was held leaning toward the right. The right

[1] J. Donath: Ein Fall von diphtheritische Hemiplegie. Neurologisches Centralblatt, 1893, xii. p. 481,

leg was dragged in walking. The right triceps and patellar tendon reflexes were much increased, and there was also ankle-clonus. On the left side all was normal. The sensations of touch and pain were tolerably prompt on the right, but somewhat less plain than on the left. The right upper extremity was slightly diminished in volume, the right lower extremity less so. There was nothing remarkable about the electrical reactions. There was no paralysis of accommodation. The right eye had 7.0 D. of hypermetropia, and there was convergent strabismus. In the left eye there was slight myopia. On May 18th the speech was still indistinct. The face was nearly normal. The extremities were more useful. The arm could be raised and stretched out. The patient could run moderately well. Donath concludes that since five months had elapsed and contractions had formed, the paralysis was due to hemorrhage.

Sharples[1] reports another case in a boy of thirteen years. There were cases of diphtheria and erysipelas in the house, and the boy had diphtheria. Before the membrane was gone the heart became very rapid and irregular. At midnight, December 4, 1893, he became suddenly paralyzed on the right side. There were no convulsions. He cried out several times during the evening preceding the attack. Twenty-four hours later there were tremors on the right side which shook the whole body. The skin was extremely hypersensitive. The tendon-reflexes were absent. There was aphasia. The heart was irregular and weak, but there were no murmurs. The urine was scanty, but it is not mentioned whether albumin was present or not. Four months later the gait was hemiplegic. Motion was better, but there was paresis on the right side. There was no athetosis. The tendon-reflexes were increased, but there was no ankle-clonus. The skin-reflexes were increased. There was no reaction of degeneration in the muscles of the right side. There was moderate atrophy of the right upper and lower extremities. The aphasia was improving. Sharples thinks the hemiplegia in this case was due to embolism.

Apolant reports another case.[2]

G. R., thirteen and one-half years old, had had measles, chicken-pox, and scarlet fever, with nephritis. At the beginning of April, 1892, he had a severe attack of diphtheria. The mother noticed that fluids regurgitated through the nose, and that the voice was nasal. There were at this time œdema of the face and a small amount of concentrated, cloudy urine. During the night of the 15th–16th of April the patient was very restless and cried out. The next morning he was conscious, but remembered nothing about the night. The mother then noticed that the arm hung flaccid by the side, and that he walked with difficulty. The weakness of the right arm and leg is said to have increased gradually. In June he went to school again, but could not write, as he had twitching of the fingers of the right hand, and he could not see well (paralysis of accommodation?). He often fell when running. Walking was also difficult, and the right arm could not be used well. He was said to have had no disturbance of speech, except that it was nasal. The difficulty in moving the arm and leg continu-

[1] C. W. Sharples: Cerebral Palsy of Childhood Following Diphtheria. Medical News, Philadelphia, August 4, 1894, p. 124.

[2] E. Apolant: Hemiplegie nach Diphtheritis. Inaug. Dissert. Berlin, 1894.

ally increased, and sensation was also diminished on the right. On June 20, 1894, the patient came to Prof. Mendel's clinic, where it was noticed for the first time that the right lower facial muscles were paretic, and that the tongue deviated to the right. The uvula was in the middle. The pupils were equal and reacted to light. The external ocular muscles were normal. The heart was negative. There was paresis of the right arm with weakness and spasm of the muscles. No disturbance of micturition. The right leg was weaker than the left, and there was especial difficulty in moving the toes. The patellar reflex was greater on the right than on the left. Sensation was diminished over the whole right side. Examination on July 3, 1894, showed the patient to be of normal size, but poorly developed, and with small muscles and little fat. The skin and mucous membranes were pale. The heart was negative. The urine was normal and contained no albumin. The muscles of the right side of the face were more relaxed than those of the left side, and that side hung down a little more and moved less than the left side. The upper part of the face was not affected. The pupils reacted normally to light and upon accommodation. The tongue deviated slightly to the right, and the uvula was drawn slightly to the left. The left side of the soft palate moved better than the right upon phonation. The speech was normal, but gave the impression that it required more effort than normally. The right shoulder could be elevated much less than the left. The right arm hung relaxed, the elbows slightly bent, the hand midway between pronation and supination, the fingers straight. The arm could be raised almost to the vertical, but less easily than the left. Passive motion in the shoulder was very slightly difficult, in the elbow more so, because of a slight spastic contracture of the biceps and supinator longus muscles. The wrist-joint was freely movable, the fingers less so. Active flexion of the fingers was particularly difficult, and somewhat so were also their extension, abduction, and adduction. There was no evident atrophy of the right arm. The grasp on the right was fair, but weaker than on the left. The patient could walk well, but the gait was paretic and spastic. The right leg, which was moreover plainly atrophied in the thigh, was held stiffer at the knee-joint than the left, and was swung outward in walking. Motion at the hip and knee was not so easy on the right as on the left. Flexion of the right leg at the knee was plainly weaker than that of the left. The ankle-joint was freely movable. The toes, except the great toe, could hardly be moved at all. The great toe lay over the second toe. There was slight contracture of the plantar flexors, especially the flexor digitorum communis. In regard to sensation, the patient said he felt more plainly on the left than on the right. Temperature-sense, muscle-sense, and locality-sense were normal. The knee-jerks were lively, the right the greater. The abdominal and cremasteric reflexes were normal. There was no ankle-clonus. The electrical reactions showed no abnormality. There was no ataxia, and Romberg's symptom was absent. Apolant concludes that the lesion was situated in the internal capsule of the left hemisphere, but does not attempt to decide whether it was produced by a hemorrhage or an embolus.

In the Berlin Gesellschaft für Psychiatrie und Nervenkrankheiten, Gnauck[1] presented another case of diphtheritic hemiplegia. A nine-year-old boy in his fourth year had diphtheria severely. Fourteen days later

[1] Centralblatt für Nervenheilkunde, 1891, p. 343.

there was paralysis of the left side, with involvement of the left side of the mouth. After five weeks the paralysis disappeared. In the sixth week there came on a new attack, with vomiting, pain in the left side, and delirium. The condition of the patient when shown was that there were athetoid movements in the left hand. These movements also involved the toes, and the left side of the face as well. The shoulder was shrugged often. There was diminution of sensation on the left side. Gnauck thought that the patient had a central affection after diphtheria.

To these twenty-eight cases of diphtheritic hemiplegia I am able to add two cases: one seen at the Boston City Hospital in the service of Dr. Knapp, and the other seen at the Boston Children's Hospital in the service of Dr. Bullard, to both of whom I wish here to express my thanks for their kind permission to make use of the cases.

The first case was that of Miss A. J., who came to the Boston City Hospital on April 23, 1894, She was twenty years of age, and single. Her family history was good, and she herself had always been well. When she was twelve years old she had what appeared to be an attack of diphtheria, for which she was treated at home. The trouble in the throat did not last long, how long could not be determined exactly, and the patient was soon convalescent. During convalescence paralysis of the palate came on, and fluids were regurgitated through the nose on swallowing. The sight was not affected at that time. Once during the convalescence she lost consciousness, but she had no convulsions. Whether this was due to cardiac weakness, or was the effect of the lesion of the brain which produced the later trouble, it is impossible to say. Only when she was able to be about again was it noticed that she could not use the right arm and leg as before her illness. The face was not affected so far as the patient knew. For some time she could not make herself understood when talking, though she understood everything that was said to her, but this trouble gradually disappeared in time. She had no pain in the limbs or head. At no time during the illness were the feet swollen, and there were no other signs of kidney-trouble noticed. The ability to use the right arm and leg increased, but she always had a considerable amount of difficulty particularly in the use of the hand. Physical examination showed a well-developed and nourished girl, who was slightly anæmic. She limped slightly with the right leg in walking, and the toes of that foot were not lifted well, but they were not dragged, and the leg was not circumducted, nor was the gait distinctly paretic or spastic. She did not sway when standing with the eyes closed. The right arm was usually held by the side, the elbow extended, the forearm supinated, the fingers flexed, the wrist not flexed but a little abducted. The right foot showed moderate pes equinus. There was considerable spasm of the muscles of the right lower extremity, and a general paresis which was shown most clearly in the extensors of the right foot. The rigidity of the right upper extremity was less, but was present, and the right arm was distinctly weaker than the left, which was shown chiefly in the grasp, which was decidedly weaker than that of the left hand, but also in flexion of the forearm on the arm, and in pronation and supination of the forearm. The rigidity of the arm was increased upon movements of the leg, but there was no athetosis. The right thigh measured 41.5 cm., 20 cm.

above the upper border of the patella. The left thigh, at the same point, measured 44 cm. The circumference of the right calf was 30 cm. That of the left calf, 37 cm. The left arm measured 25 cm., the right the same. The left forearm was 22 cm. in circumference, and the right 23 cm. The triceps tendon reflexes in the arms were equal. The knee-jerks were equal and lively. There was no ankle-clonus. There was considerable difficulty in using the right extremities, chiefly on account of the spastic condition, less because of the paresis. There was perhaps a very slight disturbance of co-ordination in both the arm and the leg. There was no disturbance of the muscular sense nor of the sense of position. Sensation was everywhere normal. There was no paresis of the facial muscles. The tongue was protruded straight. The two sides of the soft palate moved equally on phonation. The pupils were equal, and reacted to light and with accommodation, as well as to pain, and the associated action was also normal. There was no affection of the external ocular muscles. Speech was normal. The anterior tibial group of muscles in the right leg required a strong faradic current in order to produce any reaction. The other muscles of the right side reacted normally. There were no qualitative changes in the reactions to the galvanic current. The area of cardiac dulness was not enlarged. There was a soft systolic murmur over the pulmonic area. The second pulmonic sound was not accentuated.

The second case was that of a boy, P. G., twelve years of age, who came to the Boston Children's Hospital on May 23, 1894. He was the oldest of seven children, all of whom were living and healthy. He had had measles at six years, scarlatina at seven years, and pertussis at eight years of age. In October, 1893, the patient had diphtheria. He was ill about two months in all. About two weeks after the illness began the throat had improved so that he was able to be about the house again. About this time fluids began to regurgitate through the nose, and he could not see as well as before (probably from paralysis of the accommodation). He also said that he had diplopia. In November, some three weeks after the illness first began, he awoke from sleep one night with pain in the left extremities, which was worse in the arm, and found that he could not move either left extremity, and that the face was drawn to one side. The patient said that he was unable to speak at all. This difficulty lasted for about two months, by which time he was able to speak well again. About a week after speech was recovered he began to be able to walk again. He was admitted to the Boston Children's Hospital on May 12, 1894, about seven months after he was first taken ill. At that time there was marked atrophy (?) of the muscles of the left arm. The fingers were kept flexed, and he could not extend them. He was unable to pronate the hand. There was marked weakness of the grasp on the left side, and all the movements of the muscles of the left arm were much weakened. The shoulder-muscles on the left were also much weaker than on the right. The thigh- and leg-muscles of the left side showed muscular weakness in all directions. Sensation was not much affected. The knee-jerk on the left was distinctly greater than on the right. There was no ankle-clonus. Examination on May 23, 1894, showed a well-developed and nourished boy of normal size. There was paresis of the muscles supplied by the lower portion of the left facial nerve. The upper portion was not affected, and the left eye could be closed as firmly as the right. The tongue deviated to the left. The pal-

ate moved normally on phonation, and speech was not affected. There was paresis of the left arm, which was especially marked in the extensors of the wrist. There was considerable spasm of the muscles of the left arm on passive motion, and there was also slight atrophy of these muscles. Sensation was slightly diminished in the left arm, but less so in the lower extremity. There was slight paresis of the left lower extremity. The gait was normal, and Romberg's symptom was absent. The knee-jerk on the left side was greater than upon the right, but there was no ankle-clonus. The tendon-reflexes in the left arm were increased. The pupils reacted normally to light and with accommodation. There was no paralysis of the external ocular muscles, and no diplopia. There was slight inco-ordination in the left upper extremity, but no disturbance of the muscular sense or of the sense of position. There was no inco-ordination, disturbance of the muscular sense, or of the sense of position in the corresponding lower extremity. The electrical reactions showed a diminished excitability of all the muscles of the left side to the faradic current, but no qualitative changes to the galvanic current. The heart was negative.

Both these cases were evidently due to some vascular disturbance in the brain, and undoubtedly of the internal capsule of the left hemisphere in the first case, and of the right hemisphere in the second one. It was, unfortunately, impossible in either case to get a very accurate account of the symptoms at the time of the occurrence of the hemiplegia, and so it is impossible to say definitely in either case whether it was due to hemorrhage or embolism. We can only conclude in both cases, from the existence of permanent paresis and of muscular spasm, that the vascular lesion, whatever it was, had caused a destruction of nervous structures, which was followed by a secondary degeneration. As it was impossible to learn the condition of the heart or the kidneys at the time of the attack in either case, any help which might be obtained from knowing these facts is also excluded. It is of interest to note the fact that in the second case the patient could not speak for nearly two months after the hemiplegia came on. This rests upon his own unsupported statement, and could not be confirmed, as none of the relatives were seen, but there seems to be no reason to doubt the statement, as the boy told a straightforward story in other respects. However, the occurrence of aphasia with a left hemiplegia is certainly rare, but the fact that he could not speak at all, and that regurgitation of fluids came on previously without loss of speech, would indicate that there was a real motor aphasia in this case.

Of the thirty cases given more or less fully here, we find that the probable diagnosis in seven is hemorrhage, namely, one each of Mendel, Jäckle, Auerbach, Edgren, Seifert, Donath, and Solbrig. The embolic cases are ten, those of Buchut, Seifert, Sharples, Jones, two of Henoch's, and all four of Bókai's. The remainder, in which the diagnosis must remain more doubtful because of the ambiguity of the case or the too brief description, comprises one case each of Duchenne, Henoch, Senator,

Hirt, Apolant, and Gnauck, and two each of Mendel and Remak, and the two added in this paper.

The attack ended in death in three cases, in two of which autopsies were made. These resulted in the finding of a thrombosis of the artery of the fissure of Sylvius in the case of Henoch, and a hemorrhage into the internal capsule in that of Mendel. Unfortunately, we have no cases in which bacteriological examinations have been made or the walls of the vessels carefully examined. In two cases, one of Henoch and one of Jones, recovery took place. In five other cases it is difficult to say whether the paralysis was permanent or not, namely, in those of Henoch, Sanné, Buchut, and the two of Remak, while that of Edgren was stated to be almost well at the time of discharge from the hospital. In the remaining nineteen cases the hemiplegia was permanent, in the sense that it caused a greater or less permanent disability.

Since this article was written, still another case of diphtheritic hemiplegia has been reported. This patient was shown by Dr. Jacobsohn at the meeting on July 8, 1895, of the Berlin Gesellschaft für Psychiatrie und Nervenkrankheiten (*Neurologisches Centralblatt*, 1895, xiv. p. 794). The eight-year-old child had had diphtheria about four months before. Five weeks after the beginning of the disease a nephritis developed, which lasted three weeks. During this time a right hemiplegia came on suddenly, without loss of consciousness or convulsions. The lower part of the face was affected as in ordinary cases of hemiplegia. The right shoulder was raised, and the right arm held pressed against the side, the upper arm generally rotated outward and drawn backward, the forearm overextended and pronated, the hand abducted toward the ulnar side, the fingers flexed, and the thumb flexed and adducted toward the index-finger. The right scapula at the upper part was nearer the median line than the left one, and it was also raised. The right arm could not be raised quite as high as the left, nor could it be held so long elevated. The right shoulder was raised less well than the left. Flexion and extension of the forearm were possible, as also pronation, while supination was very incomplete, even with the aid of the biceps. Extension of the hand and fingers was impossible. Flexion of these was normal. Flexion and adduction of the thumb was good, while extension and abduction were impossible. Sensation was normal. The knee-jerk was absent on both sides. There was no atrophy, no reaction of degeneration, and no tenderness to pressure of the peripheral nerves.

Goldscheider, in the discussion that followed, said he thought the cases of hemiplegia after diphtheria were not so rare as is generally supposed, and stated that he himself had seen several, which he had not published. This statement was modified later, Goldscheider (*Neurologisches Centralblatt*, 1895, xiv. p. 848) then stating that he had seen not several, but one case of hemiplegia after diphtheria.

A CASE OF LANDRY'S PARALYSIS, WITH AUTOPSY.

By Theodore Diller, M.D.,
VISITING PHYSICIAN TO ST. FRANCIS HOSPITAL, PITTSBURG,

AND

Adolf Meyer, M.D.,
PATHOLOGIST TO THE WORCESTER LUNATIC HOSPITAL AND DOCENT IN PSYCHIATRY, CLARK UNIVERSITY, WORCESTER, MASS.

It is a matter of much regret to us that the clinical history of this case is meagre and imperfect and that the autopsy was incomplete; yet in spite of these drawbacks the case is one presenting features of great interest. We are aware that there is room for difference of opinion as to the diagnosis, yet the history and the clinical observations of Dr. Diller, who watched the progress of the case, to our minds, favor this diagnosis rather than any other, viewed from a clinical standpoint. If the diagnosis of Landry's paralysis be accepted the post-mortem findings must be considered as of great value as throwing light upon the obscure question of the morbid anatomy of this disease.

History of the case by Dr. Diller:

R. W., married woman, aged fifty-three years, admitted to St. Francis Hospital, Pittsburg, May 10, 1894, with loss of power in legs which had developed suddenly about ten days previously. This loss of power was not absolute, but constantly progressed, although with assistance she was able to stand as late as June 10th. One week after admission she began to lose power in the arms and control of the vesical and anal sphincters. This loss of power in arms and legs and over sphincters increased steadily and became absolute about two weeks before her death, which occurred on August 8, 1894. About a week or ten days before death bulbar symptoms developed rather rapidly, as evidenced by increasing difficulty in phonation and deglutition. Indeed, during the last few days she lived swallowing was attended with such danger that she was fed by the stomach-tube.

Mentally she seemed bright enough until after the bulbar symptoms developed, when her mind became somewhat clouded.

Pain, tactile, and heat and cold sense were, as determined by tests on several occasions, unaffected. Both knee-jerks were lost. There was some swelling of both knee-joints (probably due to old rheumatic trouble), and forced movements of them caused outcries of pain.

At the time of death there was no appreciable atrophy of any part of the muscular system. The electric reactions were normal. She developed no bedsores. No fever or pain at any time (except upon motion as noted). Death was due to respiratory failure. Clinically, the case was one of ascending motor paralysis. The successive involvement of legs, arms, and muscles of deglutition and phonation, while sensation and nutrition remained intact, indicated that the disease-process was a progressive ascending one, involving the motor apparatus of the cord and medulla and leaving uninjured the sensory and trophic apparatus.

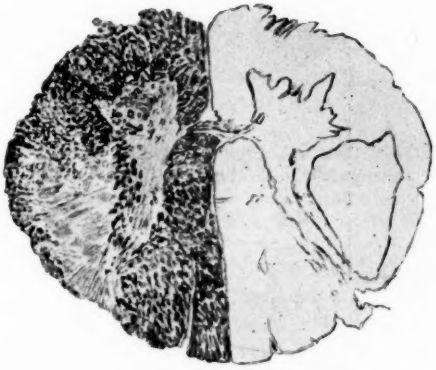
The absence of atrophy, of pains and of knee-jerks, and the preservation of sensation seemed sufficient to throw out the diagnosis of poliomyelitis, general myelitis, amyotrophic lateral sclerosis, and multiple neuritis.

From Landry's paralysis the case differs somewhat only in two features, viz., rather slow development and long course (fourteen weeks) and the paralysis of the sphincters. Cases are on record, however, in which the sphincters were involved.

Pathological Report and Analysis of a Case and of Literature, by Dr. Meyer.

The spinal cord only and the anterior and posterior roots were examined. The stains used were Ehrlich-Biondi, hæmatoxylin, and Weigert-Pal. Macroscopically nothing could be seen in the cord that would have indicated disease.

FIG. 1.



Mid-cervical region.

The left side gives the relative appearance of the tracts of the cord, the right side the outlines of the degeneration in the lateral columns. Drawn with Edinger's projection apparatus; enlarged twelve times.

The sections, however, showed very plainly the following changes:

Weigert-Pal sections. In the cervical region (Fig. 1) the area of the pyramidal tracts is very distinctly outlined, decidedly lighter stained than even the anterior horns, though not so light as the gelatinous substance of the posterior horn. The direct cerebellar, antero-lateral, and posterior tracts are deeply stained; also the ground-bundles. Counterstain with carmine demonstrates the presence of a rather large amount of "connective tissue" in the region of the pyramidal tracts; in this tissue there remain a large number of medullated fibres well stained. The uncrossed tract is not affected. The same condition is noted in the upper and lower dorsal region and in the lumbar region. (Fig. 2.)

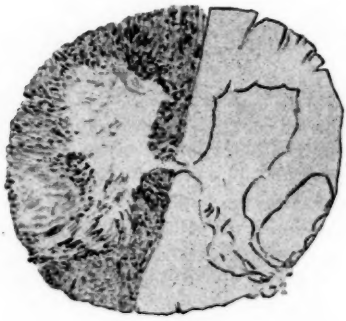
Biondi-Ehrlich stain. Marked hyperæmia of the area of the crossed pyramidal tracts and increase of neuroglia-fibrils. (Fig. 3.) The axis-cylinder of the pyramidal fibres slightly rarefied, but nowhere in a con-

dition of decay or swelling. The process of disease is probably stationary in the cord.

Hæmatoxylin-stain shows a slight increase in the number of nuclei in the area affected.

The anterior horns are not affected so as to give evidence of disease with the hardening in Müller's fluid. Only the marked pigmentation

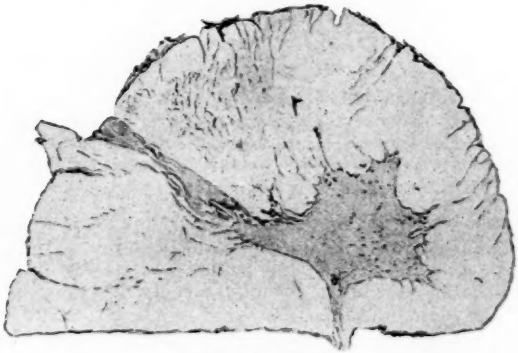
FIG. 2.



Lumbar region.

of the ganglion-cells attracts attention. The roots of the spinal nerves are free from degeneration. In the dorsal region defects can be noticed in the posterior columns. They are, however, only present in a piece of

FIG. 3.



Mid-cervical region.
Stain with Ehrlich-Biondi's color-mixture. Hyperæmia of pyramidal tract.

cord that was bent. This and the absence of reactive changes (increase of neuroglia-fibres) speak very much in favor of the view that the falling out of a number of axis-cylinders is a mere post-mortem injury.

The findings are thus limited to a partial decrease of medullated fibres

in the crossed pyramidal tracts, with secondary increase of the neuroglia-fibres, in the whole extent of the spinal cord, and excessive pigmentation of the anterior horn-cells.

The medulla oblongata and the brain, and also the peripheral nerves, were not available for examination.

A review of the cases of Landry's paralysis with autopsy was compiled by Dr. A. Cramer in 1892.[1] Several cases have been reported since.

A perusal of the literature up to the date mentioned shows that the clinical picture has been taken very broad, allowing quite a number of cases of plain polyneurites to be classified under the head of Landry's paralysis. Polyneuritis may be an acute ascending paralysis; but an acute ascending paralysis need not be Landry's paralysis because the disease shows first in the legs and then rises gradually to the upper segments of the body. The cardinal points for the differential diagnosis should be:

1. Flaccid paralysis of the muscle, spreading rapidly from one point over the rest of the body, generally beginning in the legs, but sometimes following the reverse order, as in the French zoölogist Cuvier.
2. Absence of muscular atrophy and of electrical reaction of degeneration.
3. Tendon and superficial reflexes absent.
4. Sensibility not, or only slightly, impaired.
5. Sphincters, as a rule, intact (exceptions rather frequent).
6. A criterion has been the absence of an anatomical lesion.

Among the twenty-seven cases with fairly satisfactory post-mortem examination, collected by Cramer, we find nine without findings, seven of which were reported before 1876. In the one of Kahler and Pick (1880) the peripheral nerves are not mentioned, although there was diminished electric reaction; the case of Strümpell (1883) is without examination of the peripheral nerves and does not contain any remarks on the electric reactions. Considering everything, there is some reason to believe that it is not pure chance that most of the cases without pathological findings date from a period when the technique was defective, and that all of them date from before the time when Weigert's hæmatoxylin method was published (1884); the case of Albu forming the only exception. (See below.)

The peripheral nerves alone were found diseased in six cases. The case of Eichhorst (1876) would now be classified clinically as polyneuritis (anæsthesia and reaction of degeneration in paralyzed parts). One case of Dejerine (1879), one of Eisenlohr (1890), might have been suspicious for polyneuritis (paræsthesia and diminished electric reaction). Among

[1] Dr. Cramer: Die Pathologische Anatomie der Landry'schen Paralyse. Zusammenfassendes Referat. Cbl. f. allg. Path. u. path. Anat., Bd. iii. pp. 6-21.

the three genuine cases that remain in this group, the one of Nauwerck and Barth (1889) is the most remarkable, since the patient, a girl of eighteen years, lived three months, with flaccid motor paralysis of legs, trunk, and arms, and finally died of bulbar symptoms. The sphincters were free, sensibility only slightly interfered with, electric reaction normal. Clinically the case resembles ours most of all.

In seven cases the spinal cord alone was affected. In only two of these (Eisenlohr, 1878, and Immerman, 1885) the peripheral nerves were positively pronounced intact; in the others the question remains unanswered. Baumgarten (1876) found bacteria and cell-infiltration in the cord; v. d. Velden (Leyden) disseminated myelitis, with cloudy swelling of anterior horn-cells; Eisenlohr (1878) exudates round the bloodvessels and numerous small hemorrhages; Kummel (1881) observed hemorrhages in the restiform bodies in a case of typhoid fever (fourth week), who died four days after the onset of paralysis, without disorder of the reflexes; Aufrecht (1881) had two cases with small myelitic foci. Immerman's case of six weeks' duration showed numerous granule-cells and hyaline degeneration of anterior horn-cells.

In the remaining five cases lesions of both peripheral nerves and spinal cord are reported. The earliest one dates from 1868 (G. Harley and J. Lockhart Clarke): softening in the anterior roots and in the cord; duration, six days. In the case of Schulz and Schultze (1882) reaction of degeneration and paralysis of sphincters are recorded. Decay of medullary sheaths in peripheral nerves, swelling of axis-cylinders in the cord, and cloudy swelling of motor ganglion-cells and also disintegration of the muscle-fibres were found; duration, four weeks. Hoffmann (1884) reports, in his case, swelling of axis-cylinders of anterior roots, lateral columns, pyramidal tracts, and corpora restiformia and capillary hemorrhages. Centanni's case (1889) showed invasion of peripheral nerves by bacilli and slight affection of cord without bacilli; Eisenlohr (1890) had one case with interstitial and parenchymatous neuritis and obtained three kinds of micro-organisms from the sciatic nerve and the spinal cord.

Seven autopsies of fairly typical cases have been published since, and are accessible to us in abstracts of the *Neurologisches Centralblatt*. In one of them (J. Watson, *British Medical Journal*, December 10, 1892) nothing was found but slight congestion of the membranes of the cord. It is impossible to say, from the abstract, how extensive an examination was made. The case of Pribykow (*Neurologisches Centralblatt*, 1894, p. 716) was one of polyneuritis, probably involving the spinal cord; he found numerous granules with Marchi's method, where other stains had not shown anything abnormal. The peripheral nerves were extensively affected. In the case of Albu (*Zeitschrift für klinische Medizin*, Bd. xxii.) the macroscopical and microscopical and bacteriological examinations were negative. The patient died on the fifth day.

Hun[1] published another typical case of twelve days' duration, with degeneration of fibres of the anterior roots of the cauda equina and thickening and infiltration of the walls of the anterior spinal vein; and Klebs ("Ueber Landry'sche Paralyse," von Prof. Klebs in Zürich, *Deutsche med. Wochenschrift*, 1891, No. 3) found in his case hyaline thrombi within the area of the central arteries of the spinal cord.

There remain the two cases of Hlava[2] and Eichberg.[3] They both showed round-cell infiltrations and small hemorrhages in the anterior horns of the spinal cord, without degeneration of the anterior roots.

Adding the findings of our own case to those mentioned above, we would sum up our view as follows:

Landry's paralysis is a symptom-complex without quite uniform post-mortem findings. There may be cases of very rapid course in which the naked eye, and even microscopical examinations with the help of older methods, does not reveal any lesion. With the improvement of the technique, these cases have become very rare, and there is reason enough to believe that the most recent technical proceedings would have demonstrated changes in most cases. Hereby one of the most important items that induced Landry to describe this symptom-group as a disease, *sui generis*, has fallen; the post-mortem findings can no longer be said to be negative, but they are at least not quite uniform.

Since polyneuritis and the forms of paralysis depending on it have been separated more closely from the so-called spinal paralysis, many cases apparently following the type of Landry's paralysis, but exhibiting sensory disturbances, electric reaction of degeneration, and perhaps the characteristic pain, spontaneous or on pressure, of neuritis, have led to the conclusion that every case was properly a polyneuritis, with or without spinal complication, but not far enough developed to give all the characteristic symptoms. This is the view of J. Ross and J. S. Bury,[4] who analyzed ninety-three cases of Landry's paralysis up to 1888, and claimed that it was too acute to give all the symptoms of polyneuritis, but identical with it, because it had the same etiology. Eisenlohr takes a broader view, on ground of his own cases with autopsy. He, and with him Cramer, states that either the peripheral nerves alone, or the peripheral nerves and the central nervous system, may be diseased, and that the peripheral nerves are involved in almost all cases. Clinical and anatomical evidence to this effect has been obtained in abundance.

[1] Henry Hun: The Pathology of Acute Ascending Landry's Paralysis. New York Medical Journal, May 20, 1891.

[2] Polymyelitis Acuta Disseminata Partialiter Hæmorrhagica (Paralysis Landry). Archives Bohèmes de médecine, Tome IV., fasc. 2, p. 256.

[3] A Case of Acute Ascending Paralysis with Rapidly Fatal Issue. Medical Record, February, 1891.

[4] On Peripheral Neuritis, 1892.

While this paper was going through the press a patient presenting the following features was observed by one of us (Dr. Diller): A middle-aged man, known as a steady drinker, developed loss of power in legs, besides pain and great tenderness of nerve-trunks, atrophy, loss of knee-jerks, failure of memory, and other mental symptoms. Subsequently the trunk and then the arms became involved in the same manner as the legs. Finally, bulbar symptoms developed, and death soon followed. Paralysis of vesical and anal sphincters and bed-sores (which developed to enormous size) were prominent features after the trunk and arms had become involved. Clinically this would seem to be a case of acute ascending alcoholic multiple neuritis, in which there was serious involvement of the cord.

In looking over the history of the diseases of the nervous system that do not depend on a well-localized lesion, we find several instances of similar fluctuation of explanatory hypotheses. Paretic or paralytic dementia, for instance, has been styled leptomeningo-encephalitis chronica diffusa; now we know that the process of degeneration is not limited to the pia, nor to the cerebral cortex, nor to the brain as a whole, but that there are few cases in which the spinal cord and the peripheral nerves are not affected as well. The same holds for alcoholic neuritis. In a great number of the cases there are marked central disorders, especially loss of memory, delusions, etc.; in lead-poisoning, too, we find not only affections of the peripheral nerves, but also of the spinal cord and brain; nevertheless, we find both these forms simply classified as polyneuritis, because the peripheral lesion gives the best analyzed symptoms. We find also that the old division of peripheral and spinal and cerebral disease can no longer be upheld for anatomical reasons. A peripheral motor-fibre can never be a unit, since it is merely a process of a ganglion-cell in the anterior horn of the cord or in the motor nuclei of the medulla oblongata. The motor symptoms, and also the electric reaction, are the same whether the interruption of function takes place in the anterior horn-cells or in their processes. A lesion of the ganglion-cell involves the processes, and a lesion of the processes involves the ganglion-cell; hence it is practically impossible to outline the limitation of consecutive changes even to a well-localized affection of a nerve, as, for instance, a contusion or section, and certainly much less so the area involved by a diffused process of inflammation or degeneration, and it is certainly arbitrary to call the process simply myelitis or simply polyneuritis.

While we owe most of the present accuracy of clinical neurology to the rigid attempt at localization of lesions, localization must take a broader field and begin more and more to cover the localization of function and its anatomical substrata without paying attention to accidental topographical dividing-lines, if we wish to do justice both to the recent findings and to the traditions of clinical neurology.

To Moebius (*Abriss der Lehre von den Nervenkrankheiten*, Leipzig, Amb. Abel, 1893) is due the credit of having broken the orthodox method of classifying nervous diseases according to the localization of their lesions only. A hemorrhage, an injury, a tumor, a focus of localized inflammation, must, of course, determine symptoms that are best systematically arranged according to the old system depending on localization. But for a great proportion of diseases the etiological characteristics give a very satisfactory systematic basis, and there seems to be little doubt that ultimately the general pathology of the nervous system will be much benefited by the departure.

The entire group of intoxications, either of real toxic or of microbic origin, is characterized by only relatively localized affections of the nervous system. It is true that polyneuritis is most frequently the most prominent feature of the acute forms; but very often the symptoms cannot all be explained on the basis of merely peripheral disease, and pathological anatomy proves plainly that a purely peripheral disease in the old sense is hardly possible (compare the research of Nissl, *Cbl. f. Nervenheilkunde*, July, 1894), and that indeed there are, as a rule, microscopical changes not only in the large ganglion-cells of the anterior horns, but also more diffusely in other parts of the cord. It seems in none of the cases an accurate examination of the brain has been made. Probably there would be lesions there as well.

There is probably no writer who would to-day refuse the view that Landry's paralysis and allied acute destructive processes in the nervous system are most probably of toxic origin. The nature of the toxic matter and the special disposition of the individual exposed will determine the character and extent of the symptom-complex. What are they? There are four cases on record in which bacteria were found in the cord or in the peripheral nerves, or in both. Baumgarten (1876) found characteristic bacteria in the cord. Curschmann found typhoid bacilli in the cord of a case that died during typhoid fever. Centanni (1889) described bacteria in the peripheral nerves of his case, and Eisenlohr found no less than three kinds of micro-organisms in one of his cases. On the other hand, there are quite a number of cases in which very careful bacteriological examination of all the organs was quite negative. This seems to be certain that there is not a special germ that would alone and always produce the same effect, Landry's paralysis. If one of us (Dr. D.) submits the suggestion that the micro-organism that engenders the poison is one which is harmless in the body under ordinary circumstances, but which under peculiar circumstances becomes pathogenic, and results in bringing about this disease, we must admit that the cases in which a complete bacteriological examination of the internal organs was negative still remain unexplained; on the other hand, the cases following typhoid infection and influenza will probably

be explained as caused by specific reaction to those specific infectious diseases. How far Edinger's Ersaztheorie will explain the peculiar distribution of the lesion in the individual cases remains to be shown when more attention will be paid to such questions of etiology and predisposition. His idea is that every toxic process properly is an interference with nutrition, amenable to repair within certain limits, but irreparable when the modulus of elasticity is surpassed; disorders of nutrition are most deleterious in those mechanisms that are least deeply rooted, least stable. It may satisfy many to know that in locomotor ataxia the post-syphilitic disorder of nutrition and function attacks almost exclusively the posterior columns of the cord and the posterior roots. But there arises the question: Why are certain spinal segments affected in preference to others (in cervical tabes, etc.), and why does the patient not show the symptoms of general paralysis, etc.? In a similar way we should ask, Why does the process of intoxication in our case affect largely the pyramidal tracts and perhaps the posterior columns and least the anterior roots, while other patients with the same affection have almost exclusively polyneuritis?

Our case does not give any clue in this direction as far as it could be examined. It seems to be unique, since no other report mentions a marked atrophy in the pyramidal tracts (cf., however, the case of Hoffman). There is one clinical case reported that might have an element of similarity if we would look upon it as one of a lesion within the possibilities of repair, involving the peripheral nerves, especially of the upper segments of the body (including the motor nerves of the eye), and the terminal apparatus of the central motor path (the end brushes the pyramidal tract), especially in the lumbar region. Muratow reported the case in the Society of Neurologists and Alienists at Moscow, January, 1892, as a case of acute ascending paralysis (Landry). (*Neurolog. Centralbl.*, 1892, p. 493). It is anomalous in many respects and an instance worth knowing of the polymorphous character of the disease. There was atrophic paralysis of the four extremities, the muscles of the trunk and the diaphragm, serious bulbar symptoms, and hyperæsthesia and pain in the course of the nerves, besides other purely neuritic symptoms. Moreover, there were nystagmus, dilatation of the right pupil, and exaggerated knee-jerk and ankle-clonus on both sides. The patient recovered.

If we recognize a certain uniformity in the *modus operandi* of the exciting causes of acute ascending paralysis, and if we recognize that the same cause may produce various types of disease in various individuals, we might look out for a common term for these forms, since the types are rarely pure. Oppenheim is evidently in favor of the extension of the term Landry's paralysis when he says that it had been too narrowly outlined by Landry. Eichberg (*Medical Record*, February, 1891) tries

to avoid the difficulty by calling his case one of acute progressive motor paralysis. This name is certainly too narrow, since it does not take into account the hyperæsthesia that was present in his own patient. Leyden divides the cases into neuritic and bulbar ones, according to the starting-point and the chief distribution of the degenerative process. This classification is also too one-sided. The real bulbar cases are very rare as compared to those that begin in the lumbar cord, and it would be at least safe to make a third group of principally spinal cases.

There is a group of acute general nervous affections which have common features in their etiology, their rapid onset, and their course, most probably the result of acute infectious or toxic toxæmia or of exhaustion. According to the age and predisposition of the patient and the character of the poison, fairly definite groups of functional elements are involved which allow us to recognize marked clinical pictures with corresponding anatomical conditions.

1. In early childhood the prevalent forms are acute poliomyelitis; acute encephalitis is probably not belonging here, against the view of Strümpel.

2. In the adolescent and in the adult, polyneuritis, with distinct prevalence of the peripheral nerves, and Landry's paralysis, with prevalence of spinal symptoms.

There seems to be little doubt that acute "delirium grave" forms a parallel to these affections among mental diseases. These groups are by no means rigidly separated. Thus, we know of diphtheritic acute nerve-intoxication, that it comes into the picture of polyneuritis even in children; and in the adult the acute nerve-intoxication shows various transitions from polyneuritis to the spinal form, Landry's paralysis, and even involvement of the central motor path. The prevalence of the motor symptoms is very marked.

Our means of diagnosis are insufficient at present to localize the lesion in every clinical case more than approximately. The pathological findings vary according to the duration of the disease, and certainly also according to the methods employed for the examination.

More stress should be laid in the future on the study of etiological and predisposing factors, and, if possible, more elaborate precautions should be taken in the autopsy. On ground of the present experience the pathological examination should comprehend a study of at least the chief peripheral nerves, the cord, the medulla, and the cerebral cortex (at least the motor area) with the recent rapid stains (Nissl and Rosin) and with the osmic acid and ordinary fixation (Müller's fluid). Moreover, a bacteriological examination of the parts mentioned and of the internal organs should be made.[1]

[1] The cases of Oettinger and Marinesco and Villa came to our notice since the above was written, and are in no way opposed to the views put forth.

POLYMYOSITIS ACUTA, WITH REPORT OF A CASE PRESUMABLY OF SYPHILITIC ORIGIN (MYOSITIS SYPHILITICA).[1]

By James B. Herrick, M.D.

ADJUNCT PROFESSOR OF MEDICINE, RUSH MEDICAL COLLEGE, CHICAGO; ATTENDING PHYSICIAN TO COOK COUNTY HOSPITAL, CHICAGO, ETC.

Acute inflammation of muscle may be the result of direct extension from some inflammatory focus, primary in some neighboring organ or tissue. Under this head would be classed myositis secondary to suppuration in bone, gland, joint, pleura, etc.; to actinomycotic, anthracic, gangrenous, or neoplastic foci in neighboring parts. Under this head also must be classed the periarteritis nodosa of Kussmaul.

Hæmatogenic myositis occurs in pyæmia (multiple muscle-abscess), acute rheumatism, typhoid fever, and the other acute infectious diseases (degeneratio Zenkeri). Purulent myositis from distant pyogenic focus may occur in this way.

In like manner (hæmatogenic) tuberculosis of muscles may arise, as may syphilis. And a primary, presumably hæmatogenic, as yet cryptogenic, inflammation of many muscles, known as polymyositis acuta, has recently been described. To this affection and to syphilitic myositis, both rarely met with, I desire to direct attention. As a text I present the following history:

Mrs. J. M., aged twenty-four years, native of Norway, housewife, entered the Cook County Hospital, Chicago, on November 11, 1894. From Mrs. M. herself and from Dr. S. G. West, who had treated her outside and who very kindly furnishes me some of the facts in the case, the following was learned:

The family history was negative. She began to menstruate at thirteen; menstruation had proceeded naturally and regularly, uninterrupted by pregnancies, up to date of admission to the hospital. Her habits were regular, moderate drinking of beer being the only indulgence in alcoholics. She had lived in Chicago five years. Aside from the ordinary diseases of childhood she had previously been free from illness.

To this statement of hers as to previous health, however, direct questions bearing upon possible syphilis seemed to indicate that an exception must be made. While denying any knowledge of a venereal sore, of alopecia or skin eruption, she said that about ten years before she had had a sore mouth and throat that lasted one month; and a year later small, painless swellings of the size of a bean had appeared on the anterior surface of either tibia. Motion or pressure had caused slight pain. No ulceration or discoloration of the skin accompanied or succeeded their appearance. They had gradually disappeared after five or six months. This, taken in connection with the fact that the husband admitted having been treated for syphilis, and with the general adenopathy to be described later, made the probability of syphilis almost a certainty.

Five weeks ago, about October 4th, she felt a sharp pain in the outer side of the right forearm just below the elbow. The arm at this point

became rapidly swollen and tender. Two days later the calf of the right leg was similarly affected, and three weeks later the calf of the left leg. She felt no pain or distress except in the parts affected. The appetite was good; no stomach-disturbance; the bowels regular; she slept well. Dr. West, who saw her a few days later, found a temperature of 100° to 102° F. About two inches below the external condyle of the humerus was a swelling the size of an English walnut, moderately firm, fairly well circumscribed, and apparently situated in the supinator longus muscle. The right calf was more diffusely swollen, was quite hard and painful on pressure or on attempts to move the foot. By the doctor's directions an ointment containing iodine and iodide of potassium (unguentum iodi) was used freely over the affected parts. Later the left calf was similarly affected.

Status præsens. November 13, 1894. Patient is a rather sparely built woman, slender, about five feet in height, weight one hundred pounds. Is slightly emaciated; rather pale. Makes no complaint except of pain in the affected muscles, especially when they are touched or moved. Appetite fair; sleep only occasionally disturbed by pain. General adenopathy; cervical glands but slightly enlarged, axillary and inguinal affected to a greater degree, either cubital gland the size of a small bean. Head, face, eyes, ears, throat, larynx negative; no scars in throat. Heart and lungs negative. Abdomen negative. No splenic or hepatic enlargement. Bones negative. Pelvic organs negative. Uterine cervix smooth, unlacerated, conical; os uteri small. Slight leucorrhœal discharge which is said to be of long standing. No vaginal cicatrices. Rectum negative. Urine shows neither sugar, albumin, nor casts. Blood in fresh and stained specimens showed no change in color, shape, or size of corpuscles; no parasites. There was a slight oligocythæmia, with corresponding oligochromæmia; a slight increase in the polynuclear white cells—a leucocytosis.

The supinator muscle of the right forearm showed a very slight induration, which in the course of a few days had completely disappeared, the muscle performing its function in a normal manner. The right leg, the one first affected, was swollen in the region of the calf-muscles, though the patient said the swelling had gone down a great deal. There was a hard, board-like, brawny feel—a hard œdema. Extensive movement of the foot caused great pain, as did pressure. The calf-muscles of the legs looked as they do in pseudo-hypertrophic muscular paralysis. There was a uniformly rounded, bulging contour of the calf, which showed in striking contrast to the small frame of the woman and the other moderately developed muscles. Everywhere over this area there was great tenderness on pressure, the patient saying it was "as sore as a boil." The subcutaneous tissue seemed œdematous, but the pitting made by pressure was recovered with a sort of elastic bound of the skin. The skin was but slightly reddened over the affected area. No rash was to be seen, nor could any history of a rash be elicited. The patellar reflexes were exaggerated. There was slight ankle-clonus.

The temperature on admission was 99.6°, and varied during her five weeks' stay in the hospital between 97° and 101°, usually being between 98.6° and 100°. There was no regularity about these slight rises, and the patient never presented any of the ordinary constitutional effects of fever. The respiration varied between 18 and 24. The pulse was, on the average, 90. Persistent inquiry as to the eating of poorly cooked

pork was always met with the answer that no pork of any sort had been eaten, and that no one else in the household was similarly ill.

November 23d, under strict asepsis, with ether as an anæsthetic, I made an incision into the left gastrocnemius in order to obtain a piece of the muscle for examination. A moderate inflammatory œdema was met with in the skin and subcutaneous tissue. On cutting through into the muscle about two to six drachms of light brownish-red fluid, with a few small dark-red fragments of old clotted blood, escaped. A small piece of the gastrocnemius was cut out for examination. Cultures from the fluid outside the muscular fascia were negative. Agar and gelatine cultures from the fluid that was contained in the muscle proved sterile. Cover-slip preparations and sections of muscle stained for bacteria failed to reveal any micro-organism. The microscopic appearance of the stained section will be spoken of later.

Fearing the wound was already an infected one, I packed with gauze. It later, at some dressing, became infected, and for a few days discharged a yellow pus, healing in about ten or fourteen days.

The patient had, while in the hospital, no medicine internally up to November 20th, save an occasional cathartic, or a dose of antipyrin to relieve pain. November 20th she was given eighty grains of iodide of potassium a day. It is to be remembered, however, that before this drug had been given the initial swelling in the supinator muscle had completely disappeared; the one in the right calf had diminished in size by one-half, and the left calf was not paining so much. Wet boric-acid dressings had been constantly applied from the time of entrance to the hospital.

December 12, 1894, she left the hospital, able to walk, though with a limp.

I saw her at her home a few weeks later. The supinator and right calf-muscles were apparently normal. The left calf showed still a little hardness, and forced extension of the foot caused a feeling of tension in the calf with slight pain. The patient was inclined to favor the left leg a little in walking. There was no atrophy discoverable. Reflexes normal, glands much smaller.

Sections of the excised piece of muscle showed extensive and diffuse inflammatory changes. The muscle-fibres varied in size, were of homogeneous appearance (hyaline degeneration); in only a few specimens could faint transverse striæ be found. There was pronounced nuclear proliferation, many mitotic figures being seen. Large round and oval cells, believed to be proliferating nuclei, formed a prominent part of the picture. Spaces were seen here and there, looking as though a fibre had disappeared. Some fibres seemed to be split longitudinally. Everywhere between the bundles of fibres and between the separate fibres, and particularly about the vessels, there were aggregated polynuclear cells. Hemorrhagic extravasation was prominent in one portion of the specimen, and blood-pigment could be seen here and there where no hemorrhage could be made out. The piece excised showed, therefore, advanced diffuse hemorrhagic myositis. No trichinæ were found, nor, as said, any bacteria.

RECAPITULATION OF CASE. Woman, aged twenty-four years syphilitic, has suddenly developed in supinator longus a painful swelling; two days later right calf-muscles and three weeks later left calf-muscles similarly, but more diffusely, involved. Swelling, pain, tenderness, board-like hardness over muscles. No abnormal sensations, no nerve-tenderness; reflexes slightly increased; general adenopathy; no eruption; no profuse sweats; subsidence of evidences of inflammation in arm and right leg, the only medication being the inunction with the iodine unguent. No history or evidence of traumatism nor of infection save syphilis. Examination of muscle shows diffuse inflammation attended by hemorrhage; no parasites, animal or vegetable, discovered.

Diagnosis. Polymyositis acuta diffusa hemorrhagica syphilitica.

While this case does not, I believe, belong in the category of the classical primary acute polymyositides, it presents so many points of resemblance to these cases that I feel warranted in reviewing briefly what is known concerning this interesting, and until recently wholly unknown, affection. The disease to which the name polymyositis acuta has been given was first accurately described in 1887 by Unverricht, Hepp, and E. Wagner. Unverricht's case was as follows:

A previously healthy stonemason, aged twenty-four years, had pain in arms, legs, later in abdominal muscles On twenty-second day, swelling of affected muscles. Face, including lids, œdematous. Urticaria-like eruption on forehead. Profuse sweats; spleen enlarged; fever up to 38.5° C. Later involvement of muscles of deglutition and respiration; lobular pneumonia; death on thirty-fourth day. No nerve-symptoms.

Autopsy. (Marchand.) Myositis acuta præcipue musculorum extensorum extremitatum; anasarca et œdema intermusculare; hyperplasia lienis; pneumonia lobularis confluens duplex. The muscles were swollen, dull, lustreless, grayish, with hemorrhagic reddish areas. Diaphragm and eye muscles negative. No trichinæ. No culture-experiments. Microscope showed interstitial round-cell infiltration, large and small hemorrhagic extravasations, muscle-substance in all stages of degeneration, striæ in places completely lost, fibres swollen, often granular, hyaline, or fatty.

Unverricht compares his case with those of Scriba. The latter's case was one of multiple muscle-abscesses healing under evacuation of pus. A lesion of the skin or mucous membrane was, in Scriba's case, reasonably regarded as the infection atrium. Unverricht differentiates his case from the periarteritis nodosa of Kussmaul and Maier, where, with pain, swelling, hyperæsthesia, paralysis, albuminuria, there were found under the skin of the abdomen grape-sized nodes that under the microscope were shown to originate in the wall of the artery, and secondarily to involve the muscle.

Debove's and Eisenlohr's cases he believes to be neurotic, spinal in the one, peripheral in the other. In Eisenlohr's case, neuritis was found with atrophic paralysis.

The disease he believes to be of infectious origin, and raises the question whether or not some of the cases of so-called trichinosis have not been cases of polymyositis.

"Whether in all cases the course is progressive or whether lighter forms of the disease that up to this time have sailed under another flag do not occur, it is impossible to decide from the observations of a single case." (Page 549.)

Hepp, at about the same time, from Kussmaul's clinic in Strasburg, reported a case under the title, "Pseudo-trichinosis, a peculiar form of acute parenchymatous polymyositis." He found but two cases at all resembling his, those of Potain and Marchand, both, though reported under different names, now generally regarded as cases of polymyositis acuta. His case he calls "Ein blosses curiosum."

Hepp's Case. Female, married, aged thirty-six years. After two or three weeks of anorexia, malaise followed by sore throat, dry mouth, red gums, exanthem on face and chest—pain and swelling appeared in the muscles of the shoulders, neck, extremities, attended by the hard œdema. There were sweats, sleeplessness, dysphagia, cramps, albuminuria, fever even to 40° C. The sensorium was free, sensibility unaltered, patellar knee-jerk lost. Death from lobular pneumonia and suffocation, after eleven weeks.

Autopsy (Recklinghausen). Firm œdema; panniculus adiposus scanty; subcutaneous connective tissue moist; muscles reddish-yellow with hemorrhagic areas, moist, easily fractured; ocular and diaphragmatic muscles unchanged. Lobular pneumonia, right hydronephrosis.

Microscopically. No trichinæ. Muscles showed hyaline or waxy degeneration, striæ faint or lacking, muscle in places granular. Round cells in perivascular connective tissue and in vicinity of degenerate muscle. Peripheral nerves and cord negative.

Hepp's second case was an epileptic, aged twenty-one years, who, during a fit, bit the tongue. Glossitis and inflammation of many muscles of the body followed. Psuedo-fluctuation led to exploratory puncture of muscles, but no pus or bacteria were found. A sciatica due to pressure of swollen muscles led to exposure of sciatic nerve for purposes of stretching and the nerve was found normal. An urticarial eruption was present. Spontaneous recovery followed.

E. Wagner's case, reported in 1887, with Unverricht's and Hepp's furnishing the standard of comparison for all subsequent writers, is as follows:

A female cook, aged thirty-four years, a sufferer from chronic pulmonary tuberculosis of light grade, developed pain, swelling, firm œdema over the muscles of the shoulders and upper extremities. An erysipelas-like exanthem appeared on either arm. No electric changes, no nerve-tenderness. Gradually subsided, but dysphagia and suffocative attacks developed, and in one of latter, patient died.

Autopsy. Moderate chronic pulmonary tuberculosis; diffuse bronchitis; pulmonary emphysema with slight œdema; brown atrophy of heart; right ventricular dilatation; fatty liver; tubercular ulcers in ileum and colon; perimetritic adhesions; hyperæmia of brain and cord; extensive myositis with slight œdema of upper portion of body.

The affected muscles showed interfibrillary hemorrhages. The muscle-fibres were many of them homogeneous, with striæ faint or invisible. There was marked round-celled infiltration, with some large multinuclear giant-cells. It is of special interest that in one and the same muscle-bundle vari-

ous changes were occurring simultaneously. Thus were found fatty degeneration, waxy degeneration, diffuse and localized serous infiltration with well-marked regenerative changes in the muscle-substance and in the connective tissue.

No tubercle-bacilli were found. In three hundred transverse and longitudinal sections three trichinæ were detected. Wagner excludes trichinæ as the cause of the myositis on the following grounds:

1. The non-characteristic beginning of the disease, with no stomach- or bowel-disturbances.

2. The order of involvement of muscles and the sparing of the lower extremities.

3. The small number and the age of the trichinæ, the latter according to Leuckart, to whom the specimens were submitted, being at least four months old.

As there was some atrophy and some slight change noted in one of the peripheral nerves examined, Wagner is willing, though regarding the case as one of polymyositis, to admit that neuritis may have been a feature of the case.

Wagner now believes, and others as well, that another case of his reported thirty years ago was one of acute polymyositis.

Löwenfeld records a fatal case in which, with some breaks in the history and with no autopsy, there was yet enough to warrant a diagnosis of polymyositis. The case (in a male, aged fifty years) is peculiar in that the myositic trouble began apparently in the heart-muscle, gradually extended to other muscles of the body, the inflammation in separate muscles running an acute course and being followed by atrophy, which was, in the case of most of the muscles, partially or wholly recovered from. In this way, with alternating improvement and relapse, the patient lived for two years, death being preceded by dysphagia, irregular and weak heart. No changes in sensibility, no tenderness over spine or nerves could at any time be made out. A pigmentation of irregular distribution not unlike that of Addison's disease was present during a portion of the time, fading out toward the last. Löwenfeld admits that his case may possibly be a case in which there was involvement of nerves as well as muscles—a neuro-myositis.

Strümpell's patient, without known cause, was seized with nausea, vomiting, headache. Then pain in the arms and legs. Swelling most marked in muscles of the legs. Pain in chewing, speaking, swallowing. Tenderness over all affected muscles. Stomatitis. Sensibility normal. Patellar reflex weak. Reaction to both currents feeble. Ptosis; ocular paralysis. Death. Cord and nerves negative. Muscles showed finely granular cloudiness, loss of transverse striæ, hyaline degeneration, vacuolation, increase in muscle-nuclei, numerous foci of true interstitial myositis.

Plehn's case was one of an acute infectious form with high fever, splenic tumor, œdema, roseola, herpes, recovery in twelve days, with no atrophy, contractures, paralyses, or disturbances of sensibility.

George W. Jacobi reports a case of subacute progressive polymyositis with fatal outcome. Microscopically there were waxy and fatty degeneration of muscles, increase in connective tissue; secondary changes in nerve-branches probable.

Fenoglio's case was attended by pain, œdema, slight atrophy in various muscle-groups. Inflammatory changes were present in both muscles and interstitial tissue.

Prinzing's case, a male, aged fifty years, lasted five months. It was diag-

nosed in succession as rheumatism, periostitis, thrombosis. Many muscles were involved. There was moderate fever, no splenic enlargement. Patellar reflex absent. Dysphagia and cardiac irregularity were present.

Post-mortem, hemorrhagic areas were seen. The muscle-fibres varied in size, showed vacuoles often filled with detritus, loss of striæ. There was longitudinal splitting of fibres, nuclear proliferation. No bacteria. One nerve seen, was normal.

Prinzing refers to Gies's case as somewhat similar. In this case the quadriceps and triceps femoris were involved, being hard, tender, œdematous, the muscle showing waxy degeneration, the bone which was at first thought to be diseased being negative.

Waetzoldt's first case was in a woman where following, or at the same time with, a puerperal sepsis a polymyositis developed. Micrococci were found in the muscles post mortem.

His second case was likewise a post-partum case, where a perimetritic exudate seems to point to the uterus as the avenue of infection and the polymyositis as secondary. The patient recovered.

Waetzoldt cites cases of Winckel's and Fenoglio's as similar to his.

Senator's two cases are cases of myositis and neuritis:

CASE I.—Male, aged twenty-seven years; pulmonary tuberculosis; disturbance of sensibility, paralytic contracture of lower extremities with atrophy, nerve-trunks tender, reflexes abolished, reaction of degeneration, fever.

Autopsy. Ulcerative pulmonary tuberculosis; acute splenic tumor; parenchymatous and interstitial neuritis, cord negative; acute interstitial myositis with muscular atrophy. No tubercle-bacilli in nerves or muscles.

CASE II.—Male, aged thirty-three years. Muscular pains, nerve-trunks at first not tender. Later paræsthesiæ, nerve-tenderness, atrophy of muscles.

Excised piece of muscle, acute interstitial myositis with beginning cirrhosis of muscle; numerous Mastzellen.

Senator concludes that inflammation can begin primarily in the muscle and extend to the nerve, or *vice versa* the nerve may be primarily inflamed, the muscle secondarily. And believing, as he does, that the disease is of infectious origin, he thinks that the infectious material or the chemical poison may at one time affect one part of the motor mechanism, at another another. If localized in the cerebral motor areas, a cerebral paralysis will follow; in the anterior horns, a paralysis of the infantile spinal paralysis type; in the nerves, a peripheral neuritis; in the muscles, a myositis. Various combinations of these types he believes possible.

Somewhat similar views were expressed by Hoffmann, of Heidelberg, at a meeting of neurologists in Baden-Baden in 1894, his observations being made on a case of neuromyositis multiplex in a male, aged seventy years, that ran a fatal course in sixteen days.

In the discussion, Edinger and Siemerling agreed with Hoffmann as to the difficulty in diagnosis between the affections of many nerves and many muscles, and the former recalled the similarity between these cases and Kussmaul's periarteritis nodosa.

Handford reports a case of disseminated myositis and neuritis with hemiplegia, terminal gangrene, pigmentation of the skin, and followed by muscular atrophy.

Unverricht, in 1891, reported a second case. This was in a pregnant non-

syphilitic woman, aged thirty-nine years. The muscles involved were those of the legs, abdomen, chest, and later the face. There were great pain, swelling, itching; the eruption was urticarial. Labor in the case was natural, uneventful; the child healthy. No excision of muscles allowed. After five months there was no muscular atrophy, no reaction of degeneration, and but a little tenderness and induration remaining. The great involvement of the skin and subcutaneous tissue led Unverricht to call this case one of dermatomyositis. He believes the disease is infectious; that possibly it is a primary dermatitis and secondary myositis, or *vice versa*.

Senator, in 1893, reports two cases of great interest:

CASE I.—Male, six years a diabetic, aged fifty years. Sick for two weeks with muscular pains, swellings, eruption resembling that of erythema nodosum, fever, typhoid state. Microscopic examination showed extensive interstitial myositis, with hemorrhages, increased nuclei, etc. No parasites or protozoa. Senator does not believe the diabetes had any influence in producing the myositis.

CASE II.—Male, aged forty years, early in June, 1893, ate some partially spoiled crabs. Suffered soon after from anorexia, sleeplessness, malaise, stiff, painful feelings in legs. The pains increased and by last of June a physician was consulted. There was moderate fever. The right upper and lower extremities were greatly swollen, resembling massive columns; the skin was reddened. There was pain in swallowing and in loud speech. An acute hemorrhagic nephritis occurred as a complication. Recovery ensued in August, 1893. Senator inclines to exclude trichinosis, and to look upon the case as an intoxication from the spoiled crabs.

Herz believes mild cases often go under the name of rheumatism. The probability of an infectious origin is strengthened by two favorable cases occurring in two girls occupying the same room, one case rapidly following the other.

He cites two cases with fatal results in the practice of Wermann, of Dresden. The involvement of the skin leads him to call the affection "dermatomyositis."

Lewy records four cases that he regards as polymyositis acuta, three being in the same family and seeming to indicate the possibility of contagion. The case occurring last was one of extreme mildness and looked upon by Lewy as an abortive polymyositis.

Lewy tabulates the cases reported up to 1893, and finds with his four cases twenty-one that he regards as acute polymyositis.

Buss, also, under the title dermatomyositis, reports a case in a male, aged twenty-two years, in whom there were acutely developing painful swellings in the muscles, hemorrhages with later discoloration of the skin, splenic tumor, hemorrhages from the bowels, stomatitis with oral hemorrhages, angina, effusion into left knee. Recovery in six weeks. There is, however, in this case such a striking resemblance to scurvy that one must hesitate before classing it as polymyositis in its restricted sense.

C. Boeck, in a case of polymyositis, where, through a misunderstanding as to directions, immense quantities of copaiba were rubbed into the skin, believed that the copaiba was the cause of the inflammation of the muscles as well as of the skin. The patient was a male, aged twenty-one years; gonorrhea two months before. For six days after the copaiba was stopped large quantities were eliminated by the urine. The well-known effect of copaiba on the vasomotor nerves of the skin leads Boeck to think it affected in this case the vasomotor nerves of the subcutaneous tissue and muscles as well.

Etiology. A study of the cases reported under the head of acute polymyositis still leaves us as much in the dark concerning the etiology as when Strümpell wrote in 1891, "The cause is yet entirely unknown."

There is a general belief in the infectious origin. In some cases, as in Waetzoldt's and Winckel's, micro-organisms were found in the muscles. These cases were, however, atypical and a definite puerperal infection was present. The fact that in some cases, *e. g.*, Prinzing's and Hepp's, ordinary methods of examination have failed to reveal bacteria lends color to the theory of an intoxication-myositis, but no toxin has yet been proven. Winckel believed in his case that a toxic fluid substance was more the cause of the myositis than the few bacteria found. Again, the occurrence in the lower animals of myositis due to animal parasites—protozoa—the presence in a man of a well-defined muscle-parasite, the trichina spiralis, has drawn attention to the possibility, or, as Pfeiffer believes, the probability, of many of these cases being due to a protozoon, a sporozoon of the group gregarinæ—myositis gregarinosa. Specimens from muscles have been submitted to Pfeiffer from the cases of Strümpell and Unverricht, but no evidence found of the protozoa. Still Pfeiffer contends that the method of preservation and preparation of the specimens is injurious to the easy recognition of the animal parasites, and that they may be present, though unrecognizable. He calls attention also to the fact that in the hog Virchow observed a skin-rash in a case of gregarinal myositis, strikingly analogous to the skin-lesions so frequently observed in the acute polymyositis of man.[1]

Lending color to the argument in favor of an infectious origin is the oft-observed splenic tumor, fever, angina. In some cases, too, possible infection atria have been noted in ulcerating pulmonary phthisis, tubercular ulcers of the intestine, a wound of the tongue, an infected uterus. Scriba, in cases of infectious myositis, believed a break in skin or mucous membrane gave entrance to the organism or virus.

Boeck's case seems to favor the intoxication-hypothesis, and possibly the case of Senator, where the stale crabs were eaten, would be looked upon as arguing in the same direction, yet one feels sure that Pfeiffer would contend that the crab may have been poorly cooked and infected with muscle-parasites. The cases of syphilitic myositis seem to indicate that toxic substances may be the exciters of inflammation of many muscles.

In this connection I cannot refrain from thinking that Wagner, in his case where trichinæ were found, has been almost too positive in ignoring entirely the trichinatous origin of the inflammation, even though sup-

[1] It is interesting in this connection to recall the fact that Klebs (Virchow's Zeitschrift, 1891) records a case of muscular atrophy in which he came to the conclusion, after repeated examinations of specimens, that the cause was a parasite which he calls *gregarina hyalogenes*. This parasite he took at first for muscle-nuclei.

ported by the authority of a Leuckart. While three trichinæ in three hundred sections are not many, they are still abnormal. And it is not impossible that the trichina in its progress to its final resting-place in the muscle—and its course is still unknown—may excite inflammation even in places where it does not lodge. It may, it is conceivable, carry with it or allow to escape with it through the intestinal wall, other microparasites or toxins.

A very interesting case of mixed infection with trichinæ and anthrax has been reported by Zörkendörfer from Chiari's laboratory. From the muscles of four persons dying during an epidemic trichinæ were found, but in small numbers, and only after most persistent search, even in acutely inflamed muscles. But in the muscles, in the heart blood, in the spleen, were found bacilli morphologically and in other particulars resembling anthrax-bacilli. In the sections were found marked interstitial myositis, an occasional trichina, and the anthrax-bacilli. These cases indicate that trichinosis can only be excluded after most diligent search, and that trichinæ may still be present in an inflamed muscle though not found in all or even any great proportion of the inflamed areas. It may be of interest to note that in examining some of the suspected sausage many Mieser's tubes (Miesersche Schläuche) were found.

The contagious character of the affection is hinted at by some observers, particularly Herz and Lewy. No cases have been reported in children.

Pathology. The inflammatory process in the muscle presents no peculiarities differentiating it from any other acute myositis. At times the process is chiefly interstitial, at times parenchymatous, again it is diffuse. The muscle-fibres frequently show waxy or hyaline degeneration; the striæ may be partially or wholly destroyed. There may be longitudinal splitting and vacuolation. Regenerative changes are prominent. Increase in nuclei is noted in almost every case. Large cells with solitary or multiple nuclei are frequently seen. Senator, in one of his cases, met three classes of cells: 1. The normal oval form, which on separate fibres can be seen in increased numbers; 2. Large oval cells with coarsely granular protoplasm and clearly visible nuclear body; 3. A cell a little smaller than the last, circular, distinctly stained, without visible nuclear body. I refer to this because in the specimen from my own case the large round or oval cells were very abundant. Hemorrhage is a part of the pathological process in most cases. Interstitial inflammatory changes are usually noted, the collection of round cells being very great. The subcutaneous tissue shows an inflammatory œdema. The involvement of the skin in erythema, urticaria, erysipelas-like inflammation, has led some observers to speak of the disease as dermatomyositis. The muscles involved are usually first those of the extremities, from which the process may extend to all the muscles of the body, including the face, the mus-

cles of respiration and of deglutition. In one case the heart-muscle was probably involved.

Pfeiffer, who examined the specimens from Unverricht's and Prinzing's cases, says that the characteristic change is the hemorrhagic inflammation in the interstitial structure between the muscles, with granular secondary degeneration of muscle-cells. The microscopic pictures, with nuclear proliferation, connective-tissue bands, and atrophy of muscle-cells, resemble those already mentioned as met with in infected horseflesh. Prinzing's case resembled the muscle of rabbits after the injection of sarcosporidia.

In some cases, notably those of Senator, the nerves had been demonstrably involved. Whether this is primary or secondary to the affection of the muscle, or whether both nerve and muscle are simultaneously affected, cannot be definitely decided. It is well to recall Senator's theory that there may be a common cause for this peculiar affection of the muscles, for some forms of peripheral neuritis, for inflammation of the anterior horns, and for some forms of encephalitis, this cause affecting at one time one portion of the motor tract, at another another portion, while again it may, as in cases of neuromyositis, affect the nerve and muscle together.

Symptomatology. The first pictures of the disease drawn by Wagner, Hepp, and Unverricht were quite well defined. The reports from later cases, however, necessitated a modification of these typical cases. Löwenfeld, from a study of the cases up to 1890, gave the following group of symptoms as characteristic of acute polymyositis: 1. A swelling of the extremities, due to the indurative œdema of the subcutaneous cellular tissue, and in part to the increased volume of the muscle. Joined with this is a corresponding functional disturbance in the affected member. 2. The spread of the inflammation to the muscles of respiration and deglutition, with corresponding loss of function in these muscles. 3. The appearance of a more or less extensive exanthem. Moderate fever, profuse sweats, splenic tumor, with death from inhalation-pneumonia or from suffocation, were common events. Since Löwenfeld wrote, favorable cases have been reported, and cases in which some of his classical symptoms have been absent. Strümpell calls attention to the fact that stomatitis and angina are common. Pigmentation of the skin has been reported. The muscles of the face, the tongue, the heart, and even the diaphragm, that were supposed to be commonly spared, have been found involved. The kidneys in two instances have been acutely inflamed. It is therefore clear that no definite complexus of symptoms can yet be described as peculiar to this affection, and no sharp line can be drawn until the etiological factor is better understood. It is not improbable that there are cases of myositis due to some definite organism or toxin, and other cases closely resembling these due to other organisms or toxins, just as

we have true cases of diphtheria due to a definite bacillus, and other cases simulating a true diphtheria due to other organisms. It is not improbable either that some cases—particularly the milder ones—classed as acute polymyositis may have been due to the virus of syphilis. In only a few reported cases is it specially stated that the patient was not syphilitic.

A most interesting observation is that made by Lewy in his three cases, where there was apparently a contagion. The second and third cases which he reports are, however, extremely light, the third case, as he himself says, if it is a case of polymyositis, being one without inflammation of muscles, without general disturbance, with nothing but a purpuric rash, and only regarded as a case of polymyositis because occurring in a family where two other cases had been present, each with the same purpuric lesion. It is, in other words, an abortive polymyositis. Here the diagnosis is only probable, as no accurate standard is yet known.

The diagnosis of this condition presents two chief difficulties, the differentiation from trichinosis and from polyneuritis. Among other affections that should be remembered must be mentioned pyæmic abscesses, multiple thromboses, periostitis and osteomyelitis, rheumatism.

From trichinosis it can in some cases only be diagnosed by the excision of the muscle and a thorough examination for the parasite. As aids to diagnosis may be mentioned the fact that in acute polymyositis there is not the history of eating uncooked or raw pork, and it is the exception that other members of the family or household should be affected. Secondly, the primary gastric and intestinal symptoms are more pronounced in trichinosis. Thirdly, in trichinosis there are early and prominent symptoms of involvement of the muscles of the eye and of the diaphragm. The latter is commonly spared in acute polymyositis; yet it must be remembered that in Strümpell's case the eye, and in Wagner's late case, the diaphragm, were involved. Lastly, the exanthem is usually more pronounced in polymyositis than in trichinosis.

From polyneuritis the disease is differentiated by the following facts: In acute polymyositis there is, 1. No nerve-tenderness. 2. No anæsthesia or paræsthesia. 3. The skin is not trophoneurotic as in neuritis. 4. The paralysis is due merely to mechanical interference. 5. Skin and muscles in polymyositis are peculiarly œdematous. 6. There is no rapid muscular atrophy. The reflexes and electrical reaction are as yet of uncertain value in making a differential diagnosis. (Senator.) The possibility of combinations of these two forms should, of course, be remembered.

Prognosis. The prognosis, at first uniformly regarded as fatal, must now be modified. It can be said in general that the severer the onset, the greater the number of muscles involved, the higher the temperature, the graver the prognosis. The involvement of the muscles of respiration

and of deglutition results usually in death from inhalation-pneumonia. Myocardial involvement gives the added danger of cardiac failure.

THERAPY. Until the cause is known treatment is purely symptomatic.

Myositis Syphilitica. The literature on syphilis of the muscles is rather imperfect and meagre. Two forms are recognized, the gummous or circumscribed, the diffuse, and, according to some, a combined form. I make free use in what I say of syphilitic myositis, of a monograph by Lewin in the *Charité Annalen*, 1891.

Ricord in 1842 was the first to characterize an interstitial myositis, distinguishing it from the gummous, as a special form of syphilitic infection.

The microscopic changes in this form of myositis are very nearly identical with those described as characterizing acute polymyositis. There is marked interstitial infiltration with round cells. Later, if the disease is subacute or chronic, the development of fibrous tissue with contraction and induration plays a prominent part. Proliferating changes are present in the muscle-nuclei. The increase in muscle-bodies can reach a high grade. "The cells are seen arranged in varied forms in thoroughy compacted groups of from three to fifteen. These proliferating cells lie in part between the peripheral bundles, and in part press themselves into the same." The muscular fibres lose somewhat their staining capacity, may become pale, their contents granular, the striæ lost, fibres smaller and perhaps longitudinally split.

Lewin, while admitting that gummata may develop later in a muscle that is diffusely inflamed, does not believe that interstitial or diffuse syphilitic myositis is "a stepping-stone between the irritative stage and the gummous" any more than is an interstitial orchitis or hepatitis.

Ostermayer believes in a combined form where, in addition to the diffuse inflammation involving the entire muscle and producing the board-like hardness, there is a circumscribed, nodular gummous mass tending to break down, and, as in Ostermayer's cases, three in number, to discharge through the skin as a fistula or ulcer. This form he plainly differentiates from the multiple gummata of a single muscle, where several nodules are scattered through a muscle with intervening healthy tissue. In his combined form there is an involvement of the entire muscle with, in one place, a gumma. He regards the case of Bramann (*Berl. klin. Woch.*, 1889), that Lewin looks upon a diffuse syphilitic myositis with later development of gumma, as an excellent example of the mixed form.

ETIOLOGY. Lewin finds records of forty-five cases, six of which occurred in his own practice. Twenty-six were males, fifteen females. Occupation seemed to have no influence in the production of this affection. The age agreed with the age at which syphilis in general appears. From the sixteenth to the fortieth year the majority of cases were found. The cases were met with in strong, vigorous adults in private practice,

as well as in frail, weak, anæmic hospital prostitutes. Lewin believes that previous failure to treat syphilis makes the later manifestations, including myositis, more severe. The time of its appearance varied. In several cases it occurred within one year after infection; in other cases as late as fifteen years after infection. Jullien found one case in the secondary period of syphilis, one four, one four and a half, one five, one five and a half, and one seven years after infection. Ostermayer regards syphilitic myositis as distinctly a late manifestation, only exceptionally early. Complicating the myositis the syphilitic exanthemata were frequently observed—macular, papular, squamous being reported. Ulcerating and nodose skin-lesions, condylomata, ulcers of the pharynx, exostoses were also concomitants of the muscle-inflammation. The muscles affected were varied, oftenest the biceps brachii. The left biceps muscle was affected more frequently than the right, so that Lewin is inclined to exclude excessive work or strain upon the muscles as a cause of the localization of the syphilitic process. Next in frequency may be mentioned the external sphincter ani—Neumann emphasizing the fact of the frequency of this location—the masseter, the deltoid, the sterno-cleido-mastoid, the gastrocnemius. One muscle was affected in twenty-one cases, several muscles in twenty-three cases. No definite exciting cause, as a blow, a cold, straining, could be found.

SYMPTOMATOLOGY. Pain calls attention to the affected muscle. Lewin and Billroth both believe the pain is due more to the involvement of the bone and periosteum than to the affection of the muscle itself. Radiating pain is not uncommon. The pain may be nocturnal. The muscle naturally becomes somewhat weak. Pain prevents an accurate test of its strength. Flexion and pseudo-joint contractures may occur. In cases of doubt chloroform can be employed showing that the joint itself is uninjured. Spasm of the muscle is common. One of Gujot's patients broke a molar tooth through spasm of the masseter. Tenesmus, where the sphincter ani is involved, is very annoying. In Lewin's case, where the gastrocnemius was involved, the extension of the foot produced painful attacks of cramp. In the case which I report, severe pain was produced by extension of the foot, and there was a fairly well-marked ankle-clonus. Redness, swelling due to œdema, and increase in volume of the muscle are to be noted. Following the pseudo-hypertrophy of the muscle there may be atrophy and induration due to the development of connective tissue. Later fatty degeneration or ossification may occur. In some cases of extensive atrophy it is probable that the nerve itself was involved. As to site of election no one muscle seems to be preferred.

In the differential diagnosis a history of syphilis with other evidences of it are, of course, of great value. The diagnostic employment of anti-syphilitic remedies is of great value. It must be differentiated from rheumatism of the joint and of muscles, from inflammation of tendons, from

lumbago, from tetanus, from torticollis, from tumors, from cold abscesses, from exostoses, from mumps and facial paralysis, from trichinosis, from acute polymyositis.

The treatment consists in massage, electricity, the application of wet dressings, the use of mercury and potassic iodide. The disease may disappear rapidly or may be slow in yielding. Myotomy has been employed where the sphincter ani has been involved.

In the case I have reported four diagnoses come up for consideration —polyneuritis, trichinosis, polymyositis acuta, myositis syphilitica.

Polyneuritis is excluded by the peculiar limitation of the disease to regions of separate muscles and not separate nerves, by the absence of pain except on movement or pressure, by the absence of nerve-tenderness, paræsthesiæ, trophic changes, atrophy and paralysis, by the increased knee-jerk.

Trichinosis I exclude by the positive statement of the patient that she had not for several weeks before becoming ill eaten pork in any form, by the total absence of gastro-intestinal symptoms, by the limitation of the affection to three muscles, the diaphragm- and eye-muscles being spared, and by the failure to find trichinæ in the excised piece of muscle.

The case seems to have been one of acute polymyositis or of syphilitic myositis. If belonging to the former class, it is atypical in its benign course, involvement of a comparatively few muscles, absence of splenic tumor, of exanthem, of profuse sweats, persistence of patellar reflex. In the presence of definite symptoms of previous syphilitic infection and of the present activity of the syphilitic virus (adenopathy), and with a knowledge that syphilis does, though rarely, attack a muscle or muscles, producing a diffuse inflammation, one feels justified in regarding this as a case of syphilitic myositis. This I believe to be the fact notwithstanding the patient's and her physician's statement that no antisyphilitic remedies had been given before her entrance into the hospital, at which time there was but a slight relic of the affection in the muscle first inflamed. Syphilitic processes not infrequently in the primary, secondary, and even tertiary periods undergo spontaneous recovery or are apparently self-limited. And in this case there had been applied to the muscle first affected an ointment containing the antisyphilitics iodine and iodide of potassium, and this may well account for the somewhat rapid disappearance of the swelling in the two muscles first affected, over which muscles alone it was used.

The circumscribed, freely movable, and softer character of the swelling in the supinator longus, even though the muscle is itself a smaller one, suggests the possibility of the gummous character of the lesion. While there can be no question of the diffuse nature of inflammation in the calf-muscles of the two legs—using the word diffuse as implying an involvement of the entire muscle and not of some limited area—the fact

that on cutting into the muscle a rather thick, brownish-red, sterile fluid was encountered, makes one think that possibly here a small gumma had broken down. In other words, there are, it seems to me, some grounds for regarding the case as one of mixed or combined syphilitic myositis as described by Ostermayer.

CONCLUSIONS. 1. There is a definite disease primarily affecting many muscles of the human body and described as polymyositis acuta, pseudo-trichinosis, or dermatomyositis.

2. Inflammatory swelling of muscles, exanthem, splenic tumor, extension to the muscles of deglutition and of respiration, death, characterize the most typical cases.

3. Atypical and milder cases indicate that either the disease may run a benign course or that in the absence of definite means of differential diagnosis forms etiologically differing are confused.

4. Trichinosis and polyneuritis must always be excluded.

5. Syphilis may attack many muscles and, resembling acute polymyositis, must be excluded.

6. The etiology is still unknown.

7. Three hypotheses can be advanced as to its cause: 1. That it is due to a specific micro-organism (vegetable parasite). 2. That it is due to a chemical poison (toxin). 3. That it is due to an animal parasite (gregarina).

8. In doubtful cases the excised piece of muscle should be examined not alone for trichinæ and bacteria, but as well, by special methods, for protozoa.

9. Failure to find trichinæ in all areas showing inflammatory reaction, or even in the majority of such areas, does not exclude trichinosis as the primary cause of the myositis. Only repeated failure to find trichinæ after thorough examination enables one positively to assert that the case is not one of trichinosis. (Compare examination of sputum or tissue for tubercle-bacilli.)

10. Syphilitic myositis occurs in three forms—the gummous, the diffuse, the combined.

11. The diffuse syphilitic myositis is usually a late manifestation of syphilis; appears without definite exciting cause; affects no particular muscle by preference; often involves more than one muscle; may resemble acute polymyositis.

My thanks are due to Drs. S. G. West, G. H. Weaver, E. R. Le Count, D. D. Bishop, and Lawrence Ryan for kind assistance in the observation of this case and in the preparation and examination of bacteriological and microscopical specimens.

Bibliography.

Unverricht: Polymyositis Acuta Progressiva. Zeit. für klin. Med., 1887, xii.
—— Dermatomyositis Acuta. Deut. med. Woch., 1891.
E. Wagner: Acute Polymyositis. Deut. Arch. für klin. Med., 1887, 40.
—— Archiv für Heilkunde, 1863, Bd. iv. S. 255.
P. Hepp: Pseudotrichinose. Berl. klin. Woch., 1887, 17 and 18.
—— Fall mit Geschwülste und Fluctuation. Ibid., 1887, No. 22.
Potain: Bulletin de la Société med. des hôp. de Paris, 1875, p. 314.
Marchand: Breslauer Arzti. Zeitsch., 1880, 21, S. 246.
Gies: Deut. Zeitschr. für Chirurgie, xi.
Fenoglio: Rivista clinica, archiv. ital. di clin. med., 1890, xxix.
Jacoby: Journal of Nervous and Mental Diseases, xiii. 697.
Plehn: Fall von Pol. ac. mit Heilung. Deut. med. Woch., 1889, No. 12.
Löwenfeld: Ueber einen Fall von Poly. ac. Münch. med Woch., 1890, No. 31.
Schulz: Neurol. Centralblatt, 1889, S. 345.
Prinzing: Ein Fall von Poly. ac. hæmorrhagica. Münch. med. Woch., 1890, No 48.
Strümpell: Zür Kentniss d. prim. ac. Poly. Zeit. für Nervenheilkunde, i., 1891.
C. Boeck: Norsk. Mag. for Läge. Reference in Cent. f. klin. Med., 1892.
Lewy: Zur Lehre v. d. primären ac. Poly. Berl. klin. Woch., 1893, xxx.
Senator: Ueber acute und subacute multiple Neuritis und Myositis. Zeit. für klin. Med., 1888, xv.
—— Ueber acute Polymyositis und Neuromyositis. Deut. med. Woch., 1893.
Hoffmann: Neuromyositis multiplex. Archiv für Psychiatrie, xxvi. 585.
Handford: Disseminated Myositis and Neuritis. Trans. of Clin. Soc., 1890, xxiii.
Debove: Progrès médical, 1878, p. 856.
Eisenlohr: Centralblatt für Nervenheilkunde, 1879, No. V., S. 100.
Waetzoldt: Polymyositis acuta (post partum). Zeit. für klin. Med., 1893, xxii.
Winckel: Gynäkolog. Centralblatt., 1878, ii. 7.
Scriba: Deut. Zeit. für Chirurgie, Bd. xxii. S. 497.
Walther: Ueber idiopath. ac. eitrige Muskelentzündung. Ibid., Bd. xxv.
Schuele: Ueber Polymyositis. Inaug. Dis., Würzburg, 1892.
Herz: Gutartige Fälle von Dermatomyositis acuta. Deut. med. Woch., xx., 1894.
Buss: Dermatomyositis. Deut. med. Woch., 1894, xx.
Gouget: La Polymyosite. Presse méd., Paris, 1894, pp. 277 and 293.
Boison: Infectious Myositis. Arch. d' Méd. et Phar., Paris, 1895.
Trinkler: K. Kasuistik Polymyositis. Chir. Vestnik. St. Peters., 1893.
Zörkendörfer: Trichinose und Milzbrand. Zeit. für Heilk., 1894, xv.
Pfeiffer: Die Protozoen als Krankheitserreger, p. 208.
Lewin: Myositis syphilitica. Charité Annalen, 1891.
Dieckhöfer: Ueber Muskelgummata. Inaug. Dis., Berlin, 1893.
Linhart: Oest. Zeit. für Prak. Heilk., 1859.
Neumann: Myositis syphilitica. Viert. für Dermatol. und Syph., 1888, xv.
Köhler: Muskel Syphilis. Berl. klin. Woch., 1892, xxix.
Ostermayer: Beitrag zur Kentniss der Syph. Muskelentzündung. Viert. f. Derm. und Syph., 1892, iii. 13.
—— Rare Forms of Syphilis. Pest. med. Chir. Presse, 1894, xxx.
—— Pest. med. Chir. Presse, 1893, xxix.
Tychoff: Muscle Syphilis in Surgical Practice. Med. Obozr. Mosk., 1893.
Hulisch: Myositis Syphilitica. Inaug. Dis., 1891.
Prost: Myositis Syphilitica. Inaug. Dis., 1892.

Lewin's and Neumann's articles contain numerous further references to other articles, particularly by French writers.

THE INFLUENCE OF ALCOHOL AND ALCOHOLIC DRINKS UPON THE CHEMICAL PROCESSES OF DIGESTION.

By R. H. Chittenden, Ph.D.,
Professor of Physiological Chemistry in Yale University;
and
Lafayette B. Mendel, Ph.D.,
Instructor in Physiological Chemistry.

(Concluded from p. 324.)

Influence of the so-called Fusel Oils upon the Amylolytic Action of Saliva.

Since the preceding results obtained with whiskey indicate that the retarding action of this liquor upon salivary digestion is mainly associated with volatile matters other than ethyl alcohol, we have tried a few experiments[1] with the alcohols liable to be present in the so-called fusel oils with a view to ascertaining their influence upon the amylolytic action of the salivary ferment. As already stated, we have very little personal knowledge concerning the presence of fusel oil in the distilled liquors of the whiskey type. Such tests as we have made in this direction have either given negative results, or else have shown the presence of these oils in very small amounts only. Still, as they are generally considered as impurities common to low-grade liquors, it is desirable to know something concerning the action of the alcohols present in them.

Amyl Alcohol.

Experiment 133. (Saliva 1:4.)

Amyl alcohol.	Reduced copper in ¼.	Maltose formed.	Relative amylolytic action.
0 per cent.	0.1208 gram.	42.3 per cent.	100.0
0.05 "	0.1209 "	42.4 "	100.2
0.10 "	0.1215 "	42.6 "	100.7
0.25 "	0.1234 "	43.2 "	102.1
0.50 "	0.1190 "	41.7 "	98.5
1.00 "	0.1130 "	39.7 "	93.8

Isobutyl Alcohol.

Experiment 134. (Saliva 1:4.)

Isobutyl alcohol.	Reduced copper in ¼.	Maltose formed.	Relative amylolytic action.
0 per cent.	0.1137 gram.	39.8 per cent.	100.0
0.05 "	0.1122 "	39.3 "	98.7
0.10 "	0.1139 "	39.9 "	100.2
0.25 "	0.1152 "	40.4 "	101.5
0.50 "	0.1119 "	39.2 "	98.4
1.00 "	0.1161 "	40.7 "	102.2

[1] These experiments were carried out in our laboratory by Philip Dowell, B.A., Ph.B.

Propyl Alcohol.

Experiment 135. (Saliva 1 : 4.)

Propyl alcohol.	Reduced copper in ½.	Maltose formed.	Relative amylolytic action.
0 per cent.			[1]
0.05 "	0.1238 gram.	43.4 per cent.	100.0
0.10 "	0.1197 "	42.0 "	96.7
0.25 "	0.1288 "	45.1 "	103.9
0.50 "	0.1343 "	47.0 "	108.2
1.00 "	0.1254 "	44.0 "	101.3

Methyl Alcohol.

Experiment 136. (Saliva 1 : 4.)

Methyl alcohol.	Reduced copper in ½.	Maltose formed.	Relative amylolytic action.
0 per cent.	0.0988 gram.	34.6 per cent.	100.0
0.25 "	0.1005 "	35.2 "	101.7
0.50 "	0.1040 "	36.4 "	105.2
1.00 "	0.1130 "	39.6 "	114.4
2.00 "	0.1042 "	36.5 "	105.4
5.00 "	0.1067 "	37.4 "	108.0

These results make it clear that if whiskey or other distilled liquor should be contaminated with the above alcohols, their presence in any ordinary amount would not be prejudicial to salivary digestion. In fact, with the exception of amyl alcohol, these bodies, even in the largest percentages employed, tend to increase the amylolytic action of the saliva considerably above that of the control-mixture. Physiologically, this fact is of considerable interest, although it does not help explain the cause of the retardation in amylolytic action produced by whiskey, brandy, and the other liquors of this class.

Brandy (with 48 Per Cent. of Alcohol).

Experiment 137. Saliva 1 : 20.

Brandy.	Appearance of the achromic point.
0 per cent.	5 minutes.
0.5 "	7 "
1.0 "	12 "
2.0 "	17 hours.
5.0 "	no action beyond soluble starch and erythrodextrin.
10.0 "	no action whatever.
Absolute alcohol.	
5.0 per cent.	7 minutes.

[1] This result was lost through an accident, and consequently the action of the various percentages of alcohol must be compared with the action of the lowest percentage.

Experiment 138. (Saliva 1 : 4.)

Brandy.	Reduced copper in ½.	Maltose formed.	Relative amylolytic action.
0 per cent.	0.113 gram.[1]	59.4 per cent.	100.0
5 "	0.117 "	61.5 "	103.5
10 "	0.087 "	45.7 "	76.9
15 "	0.051 "	26.8 "	45.1

As with whiskey, brandy is wholly without deleterious action on salivary digestion when the saliva is not too greatly diluted and the brandy not present in quantities larger than 5 per cent. With saliva greatly diluted, on the other hand, even 1 per cent. of brandy is sufficient to cause retardation of amylolytic action. The alcohol of the brandy is in nowise responsible for the inhibitory action.

Experiment 139. (Saliva 1 : 20.)

Fluid added.	Appearance of the achromic point.
0 per cent.	7 minutes.
1 " brandy	12 "
1 " " neutral'd	7 "
5 " "	no action beyond erythrodextrin.
5 " " "	16 hours.
2.5 " absol. alcohol	7 minutes.

Experiment 140. (Saliva 1 : 5.)

Fluid added.	Appearance of the achromic point.
0 per cent.	2 minutes.
5 " brandy	12 "
5 " " neutral'd	2 "
10 " " "	2 "
5 " absol. alcohol	2 "

Evidently, such retarding action as the brandy possesses is mainly connected with the acidity of the fluid, since on neutralization of the liquor its inhibitory action is greatly diminished or even entirely overcome. The following experiment shows that, as with whiskey, the non-volatile matter present in the liquor is not responsible for the retardation of amylolytic action, but has by itself a stimulating effect on amylolysis.

Experiment 141. (Saliva 1 : 4.)

Brandy residue.	Reduced copper in ½.	Maltose formed.	Relative amylolytic action.
0 per cent.	0.113 gram.[2]	59.4 per cent.	100.0
5 "	0.124 "	65.2 "	109.7
10 "	0.116 "	61.0 "	102.7
15 "	0.104 "	54.7 "	92.0

[1] With due allowance for such reducing action as the brandy itself possesses.
[2] With deduction for the reducing action of the sugar present in the brandy.

Rum (with 51 Per Cent. of Alcohol).

Experiment 142. (Saliva 1 : 20.)

Rum.	Appearance of the achromic point.
0 per cent.	11 minutes.
0.5 "	35 "
1.0 "	1.7 hours.
2.0 "	24 "
5.0 "	no action beyond soluble starch.
10.0 "	no action whatever.
Absolute alcohol.	
5.0 per cent.	11 minutes.

Experiment 143. (Saliva 1 : 4.)

Rum.	Reduced copper in ½.	Maltose formed.	Relative amylolytic action.
0 per cent.	0.112 gram.[1]	58.9 per cent.	100.0
5 "	0.057 "	30.0 "	50.8
10 "	0.014 "	7.3 "	12.3
15 "	0.005 "	trace.	

It is to be noticed from these experiments that rum has a far greater retarding action on amylolysis than whiskey or brandy, even when the saliva is fairly concentrated. Further, the alcohol contained in the above percentage of brandy is entirely without influence on amylolytic action. This marked retarding action of rum is due mainly to volatile acid-reacting substances, presumably of the same nature as those present in whiskey and brandy, but present in larger amount. All samples of rum that we have examined have shown a decided acid reaction, considerably greater than we have found in whiskey or brandy, and to this we attribute the greater retarding action of this liquor. The following experiments attest the proof of this statement:

Experiment 144. (Saliva 1 : 20.)

Fluid added.	Appearance of the achromic point.
0 per cent.	7 minutes.
1 " rum	3 hours.
1 " " neutralized	7 minutes.
5 " "	no action beyond erythrodextrin.
5 " " "	7 minutes.
2.5 " absol. alcohol	7 "

[1] Making allowance for the reducing action of the rum itself.

Experiment 145. (Saliva 1 : 10.)

Fluid added.	Appearance of the achromic point.
0 per cent.	3 minutes.
5 " rum	16 hours.
10 " "	no action beyond erythrodextrin.
10 " " neutralized	3 minutes.
5 " absol. alcohol	3 "

Thus, simple neutralization of the acidity of the rum is all that is needed to overcome wholly the retarding action of this fluid on salivary digestion. Further, the following experiment made with the residue obtained by the evaporation of rum shows that this acidity is due to something volatilized by heat, since no trace of its action is to be found in the residue.

Experiment 146. (Saliva 1 : 4.)

Rum residue.	Reduced copper in ⅓.	Maltose formed.	Relative amylolytic action.
0 per cent.	0.119 gram.[1]	62.5 per cent.	100.0
5 "	0.119 "	62.5 "	100.0
10 "	0.119 "	62.5 "	100.0
15 "	0.116 "	60.7 "	97.1

We may summarize our results with these strong alcoholic beverages as follows: Whiskey and brandy used dietetically, say to the extent of 5 per cent. in a digesting mixture, have no retarding influence upon the salivary digestion of farinaceous foods providing the saliva is not too greatly diluted. When present in larger quantities they exert a retarding action upon amylolysis which is out of all proportion to the contained alcohol. The inhibitory effect appears to be connected in part, and perhaps mainly, with acid-reacting substances more or less volatile or destructible in nature. Rum differs from the two preceding liquors in that it has a more marked retarding action; an action dependent chiefly upon the presence in larger quantity of these acid substances, and not connected with the amount of alcohol present.

Action of Wines.

Our study of the influence of wines on the salivary digestion of farinaceous foods shows that these fluids are extremely potent in checking the action of the salivary ferment. Further, this action is entirely unconnected with the alcohol present in the wines, but is dependent almost wholly upon their acid character. Indeed, it is safe to say that as a rule the retarding action of wines on amylolysis is practically propor-

[1] Allowance being made for the reducing action of the residue itself.

tional to the acidity of the fluid. On neutralization of these acid wines their retarding action on salivary digestion at once disappears, as the following experiments show:

SHERRY (WITH 21 PER CENT. OF ALCOHOL AND 4.7 PER CENT. OF SOLID MATTER).

Experiment 147. (Saliva 1 : 10.)

Sherry.	Appearance of the achromic point.
0 per cent.	2 minutes.
0.5 "	17 hours.
1.0 "	no action beyond erythrodextrin.
2.0 "	no action beyond soluble starch.
5.0 "	no action whatever.
Absolute alcohol.	
1.0 per cent.	2 minutes.

Experiment 148. (Saliva 1 : 5.)

Fluid added.	Appearance of the achromic point.
0 per cent.	1 minute.
1 " sherry	16 hours.
1 " " neutralized	1 minute.
2 " "	no action beyond erythrodextrin.
2 " " "	1 minute.
5 " "	no action whatever.
5 " " "	1 minute.

CLARET (WITH 10 PER CENT. OF ALCOHOL AND 3.3 PER CENT. OF SOLID MATTER).

Experiment 149. (Saliva 1 : 15.)

Claret.	Appearance of the achromic point.
0 per cent.	7 minutes.
0.5 "	no action beyond erythrodextrin.
1.0 "	no action whatever.
2.0 "	" "
5.0 "	" "
10.0 "	" "
Absolute alcohol.	
1.0 per cent.	7 minutes.

Experiment 150. (Saliva 1 : 10.)

Claret.	Appearance of the achromic point.
0 per cent.	2 minutes.
0.5 "	erythrodextrin stage.
1.0 "	soluble starch only.
2.0 "	no action whatever.
5.0 "	" "
Absolute alcohol.	
0.5 per cent.	2 minutes.

Experiment 151. (Saliva 1 : 15.)

Fluid added.	Appearance of the achromic point.
0 per cent.	3 minutes.
1 " claret	soluble starch only.
1 " " neutralized	3 minutes.
5 " "	no action whatever.
5 " " neutralized	3 minutes.
0.5 " absolute alcohol	3 "

Experiment 152. (Saliva 1 : 3.)

Fluid added.	Appearance of the achromic point.
0 per cent.	1 minute.
1 " claret	4⅔ hours.
2 " "	no action beyond erythrodextrin.
5 " "	no action whatever.
5 " " neutralized	1 minute.

HOCHHEIMER (WITH 11 PER CENT. OF ALCOHOL AND 1.8 PER CENT. OF SOLID MATTER).

Experiment 153. (Saliva 1 : 20.)

Hochheimer.	Appearance of the achromic point.
0 per cent.	8 minutes.
0.5 "	erythrodextrin stage.
1.0 "	soluble starch.
2.0 "	no action whatever.
5.0 "	" "
10.0 "	" "
Absolute alcohol.	
1.0 per cent.	8 minutes.

Experiment 154. (Saliva 1 : 15.)

Hochheimer.	Appearance of the achromic point.
0 per cent.	6 minutes.
0.5 "	erythrodextrin stage.
1.0 "	soluble starch only.
2.0 "	no action whatever.
5.0 "	" "
10.0 "	" "
Absolute alcohol.	
1.0 per cent.	6 minutes.

Experiment 155.

Hochheimer.	Appearance of the achromic point.	
	Saliva 1 : 10.	Saliva 1 : 5.
0 per cent.	3 minutes.	2 minutes.
0.5 "	erythrodextrin and sugar.	16 hours.
1.0 "	no action beyond erythrodextrin.	16 "
2.0 "	soluble starch.	erythrodextrin only.
5.0 "	no action whatever.	soluble starch.
Absolute alcohol.		
1.0 per cent.	3 minutes.	2 minutes.

Experiment 156. (Saliva 1 : 15.)

Fluid added.	Appearance of the achromic point.
0 per cent.	5 minutes.
1 " hochheimer	no action beyond erythrodextrin.
1 " " neutralized	4 minutes.
5 " "	no action whatever.
5 " " neutralized	4 minutes.
0.5 " absolute alcohol	5 "

Experiment 157. (Saliva 1 : 3.)

Fluid added.	Appearance of the achromic point.
0 per cent.	1 minute.
1 " hochheimer	27 minutes.
2 " "	erythrodextrin stage.
5 " "	soluble starch with erythrodextrin.
5 " " neutralized	1 minute.

In conclusion, we may quote the words of Sir William Roberts,[1] whose views on this subject are in close harmony with our results: "Both the stronger and the lighter wines show a powerful inhibitory effect on salivary digestion. Even so small a proportion as 1 per cent. of sherry or hock was found to paralyze saliva almost completely, and even one-half or one-quarter of this proportion delayed the achromatic point appreciably. Claret and port wine behaved similarly. The inhibitory effect of wines is entirely due to the very considerable degree of acidity which they all possess. . . . When the acidity of wines is neutralized they lose entirely their inhibitory effect on salivary digestion."

Action of Malt Liquors.

Under the head of malt liquors we have experimented with essentially the same beverages as were described under gastric digestion, viz., porter, stout, lager beer, and ale, the same brands likewise being employed.

Porter.

Experiment 158.

Porter.	Appearance of the achromic point.	
	Saliva 1 : 20.	Saliva 1 : 10.
0 per cent.	11 minutes.	3 minutes.
0.5 "	79 "	18 "
1.0 "	22 hours.	74 "
2.0 "	erythrodextrin only.	174 "
5.0 "	soluble starch and erythrodextrin.	25 hours.
10.0 "	soluble starch only.	erythrodextrin only.
Absolute alcohol.		
0.5 per cent.	11 minutes.	3 minutes.

[1] Digestion and Diet, page 117.

Experiment 159. (Saliva 1 : 10.)

Porter.	Appearance of the achromic point.
0 per cent.	3 minutes.
1 "	23 "
1 " heated[1]	23 "
2 "	103 "
2 " heated	103 "
Absolute alcohol.	
0.5 per cent.	3 "

Experiment 160.

Porter.	Appearance of the achromic point.	
	Saliva 1 : 10.	Saliva 1 : 15.
0 per cent.	2 minutes.	4 minutes.
1 "	15 "	28 "
1 " neutralized	1 minute.	3 "
2 "	65 minutes.	225 "
2 " "	1 minute.	3 "
Absolute alcohol.		
0.5 per cent.	2 minutes.	4 "

Experiment 161. (Saliva 1 : 5.)

Porter.	Appearance of the achromic point.
0 per cent.	1 minute.
2 "	3 minutes.
5 "	31 "
10 "	195 "
10 " neutralized	1 minute.
Absolute alcohol.	
0.5 per cent.	1 "

From these results the conclusion is plain that porter retards the salivary digestion of farinaceous foods very greatly, but that the inhibition is due entirely to the acidity of the fluid, and not to the contained alcohol. Further, the acidity due to the dissolved carbonic acid is not connected with the inhibitory action, since the fluid freed from carbonic acid by heat produces the same retardation as the original fluid. It is likewise noticeable that porter has far less retarding action on salivary digestion than corresponding percentages of wine, owing presumably to the smaller content of acid-reacting bodies. Again, there is a suggestion in the case of neutralized porter (Experiment 160) of a slight stimulation of amylolytic action, due presumably to the presence of the various extractives.

[1] Porter which had been previously heated with an inverted condenser in a water-bath for two hours. The carbonic acid is thus driven off, while the alcohol and other volatile matters condense and flow back into the fluid, the volume remaining constant.

Lager Beer (New Haven Keg Beer).

Experiment 162. (Saliva 1 : 25.)

Beer.	Appearance of the achromic point.
0 per cent.	15 minutes.
0.5 "	20 "
1.0 "	37 "
2.0 "	45 "
5.0 "	138 "
10.0 "	175 "
Absolute alcohol.	
0.5 per cent.	15 "

Experiment 163. (Saliva 1 : 20.)

Beer.	Appearance of the achromic point.
0 per cent.	9 minutes.
5 "	77 "
10 "	147 "
15 "	147 "
20 "	167 "

Experiment 164. (Saliva 1 : 25.)

Beer.	Appearance of the achromic point.
0 per cent.	18 minutes.
1 "	36 "
1 " heated[1]	20 "
2 "	54 "
2 " heated	36 "
Absolute alcohol.	
0.5 per cent.	18 "

Experiment 165. (Saliva 1 : 25.)

Beer.	Appearance of the achromic point.
0 per cent.	24 minutes.
1 "	50 "
1 " heated and neutralized	10 "
2 "	65 "
2 " " "	10 "
5 "	80 "
5 " " "	10 "

From these results it is seen that the inhibitory action on salivary digestion of this sample of lager beer is considerably less than that of porter. Further, as in porter, such retardation as the beer causes is due wholly to the acidity of the fluid. Indeed, it is to be noticed that the neutralized beer tends to increase very decidedly the rate of amylolytic action. This is so marked as to suggest the possibility of the beer itself having an amylolytic action, although it can hardly be supposed that any amylolytic ferment present in the beer could resist the destructive

[1] Previously heated in the same manner as the porter in Experiment 159.

action of the heat applied to the fluid before it was neutralized. Careful experiments, however, with the fresh beer failed to show any amylolytic action on the part of the fluid itself; so that we are forced to the conclusion that the beer possesses a twofold action on amylolysis. The stronger action due to the acidity of the fluid is a retarding one, but when this is overcome by neutralization of the fluid, then the second action asserts itself, viz., a stimulation of salivary digestion due to some of the extractive matters of the beer. The alcohol present in the fluid is practically without action on the solvent power of the saliva on farinaceous foods. Unlike the experiments with porter, simply heating the beer (see Experiment 164) on a water-bath with an inverted condenser, so as to drive off the contained carbonic acid, tends to decrease the retarding action of the beer. This fact is hardly attributable to the loss of carbonic acid, certainly not wholly, and is perhaps due to some more profound change, since it was observed that the fluid tended to change its appearance with formation of a flocculent precipitate, etc.

MILWAUKEE LAGER BEER (PABST'S).

Experiment 166. (Saliva 1 : 25.)

Beer.	Appearance of the achromic point.
0 per cent.	10 minutes.
0.5 "	17 "
1.0 "	30 "
2.0 "	75 "
5.0 "	140 "
10.0 "	160 "
Absolute alcohol.	
0.5 per cent.	10 "

Experiment 167. (Saliva 1 : 25.)

Beer.	Appearance of the achromic point.
0 per cent.	10 minutes.
1.0 "	35 "
1.0 " heated[1]	14 "
2.0 "	75 "
2.0 " heated	35 "
Absolute alcohol.	
0.5 per cent.	10 "

Experiment 168. (Saliva 1 : 25.)

Beer.	Appearance of the achromic point.
0 per cent.	15 minutes.
1 "	22 "
1 " heated and neutralized	10 "
2 "	50 "
2 " " "	10 "
5 "	60 "
5 " " "	10 "

[1] Previously heated in the same manner as the porter and beer in the preceding experiments.

Experiment 169.

Beer.	Appearance of the achromic point.	
	Saliva 1 : 25.	Saliva 1 : 15.
0 per cent.	15 minutes.	12 minutes.
30 "	180 "	105 "

The above results are practically confirmatory of the results obtained with New Haven beer, and we may derive from them the same conclusions as have already been drawn in connection with the preceding sample.

Ale (Bass & Co.'s Pale Ale).

Experiment 170.

Ale.	Appearance of the achromic point.		
	Saliva 1 : 20.	Saliva 1 : 15.	Saliva 1 : 10.
0 per cent.	9 minutes.	5 minutes.	2 minutes.
0.5 "	19 "	7 "	3 "
1.0 "	43 "	25 "	4 "
2.0 "	200 "	75 "	7 "
5.0 "	260 "	195 "	46 "
10.0 "	320 "	255 "	64 "
Absolute alcohol.			
0.5 per cent.	9 "	——	——

Experiment 171. (Saliva 1 : 15.)

Ale.	Appearance of the achromic point
0 per cent.	6 minutes.
1 "	16 "
1 " heated[1]	14 "
2 "	54 "
2 " heated	45 "
Absolute alcohol.	
0.5 per cent.	6 "

Experiment 172.

Ale.	Appearance of the achromic point.	
	Saliva 1 : 15.	Saliva 1 : 20.
0 per cent.	5 minutes.	6 minutes.
1 "	19 "	35 "
1 " heated and neutralized	3 "	3 "
2 "	92 "	140 "
2 " " "	3 "	3 "
5 "	177 "	245 "
5 " " "	3 "	3 "

[1] Ale which had been previously heated in a water-bath with inverted condenser, more especially for the removal of the carbonic acid.

Experiment 173.

Ale.	Appearance of the achromic point.	
	Saliva 1 : 15.	Saliva 1 : 10.
0 per cent.	5 minutes.	3 minutes.
30 "	295 "	115 "

STOUT (GUINESS'S EXTRA STOUT, DUBLIN).

Experiment 174.

Stout.	Appearance of the achromic point.		
	Saliva 1 : 15.	Saliva 1 : 10.	Saliva 1 : 5.
0 per cent.	4 minutes.	4 minutes.	3 minutes.
0.5 "	10¼ hours.	14 "	——
1.0 "	22 "	4¼ hours.	5 minutes.
2.0 "	erythrodextrin.	erythrodextrin.	20 "
5.0 "	erythrodextrin and soluble starch.	erythrodextrin and soluble starch.	6¼ hours.
10.0 "	soluble starch only.	soluble starch only.	24 "
Absolute alcohol.			
0.5 per cent.	4 minutes.	——	——
1.0 "	——	——	3 minutes.

Experiment 175. (Saliva 1 : 10.)

Stout.		Appearance of the achromic point.
0 per cent.		3 minutes.
1 "		300 "
1 "	heated	161 "
2 "		20 hours.
2 "	heated	20 "
Absolute alcohol.		
0.5 per cent.		3 minutes.

Experiment 176. (Saliva 1 : 10.)

Stout.		Appearance of the achromic point.
0 per cent.		2 minutes.
1 "		83 "
1 "	heated and neutralized	2 "
2 "		415 "
2 "	" "	2 "
Absolute alcohol.		
0.5 per cent.		2 "

Experiment 177. (Saliva 1 : 5.)

Stout.		Appearance of the achromic point.
0 per cent.		2 minutes.
10 "		24 hours.
10 "	heated and neutralized	2 minutes.
Absolute alcohol.		
1.0 per cent.		2 "

Stout differs from the other malt liquors examined only in that its retarding action on salivary digestion is a trifle more pronounced, due, we think, solely to its somewhat greater acidity. Acidity is the keynote to the cause of the retarding action of malt liquors in general on salivary digestion. Remove the acidity of the fluid and we remove the disturbing factor; indeed, the neutralized malt liquors even stimulate digestion in some instances.

Thus, we find beer and ale more favorable to salivary digestion than porter and stout, simply because the former, as a rule, contain less acid than the latter. In our experiments we found stout to have an acidity two and even three times that of ordinary lager beer, and twice that of ale, while porter had an acidity somewhat less than that of stout, but twice that of beer and ale.

For example, samples of the above malt liquors showed the following relative acidity, expressed by the number of cubic centimetres of a 0.2 per cent. solution of KOH required to neutralize 25 c.c. of the respective fluids:

25 c.c.	stout	required	46.0 c.c.	alkali	solution.
25 "	porter	"	34.0 "	"	"
25 "	ale	"	19.0 "	"	"
25 "	beer	"	10–17 "	"	"

Sir William Roberts, who has also made a study of this matter, says: "Malt liquors were found to hamper salivary digestion exactly in proportion to their degree of acidity. Sound English beers have not nearly so much acidity as wines, and they interfere comparatively little with the digestion of starch; but 'turned' beer is highly inhibitory."

In concluding this chapter of our work we may again emphasize the following facts: Alcohol, even when present in considerable quantities, has no marked effect upon the amylolytic or starch-digesting power of the saliva. Alcoholic beverages, however, do have a retarding action upon amylolysis, the extent of retardation varying with the strength of the saliva. Obviously, the retardation cannot be attributed to the alcohol present. Our results, indeed, show that the detrimental factor is, in most cases, the acidity of the fluid, for after neutralization of the alcoholic liquid no marked embarrassment of amylolytic action is to be observed. Occasionally, as with whiskey, neutralization of the fluid is not followed by a complete withdrawal of inhibitory action, hence in this case we are forced to attribute the retarding action of this liquor in part to the presence of some ethereal compounds such as are frequently found in small quantity in the stronger alcoholic liquors. Wines, in virtue of their greater acidity, have a far more pronounced retarding action upon salivary digestion than the stronger alcoholic fluids, and, as might be expected, the extent of retardation caused by a given wine is

dependent solely upon its degree of acidity. Wines which have been neutralized are practically without influence upon salivary digestion.

Malt liquors, likewise, owe such retarding action as they possess mainly, if not wholly, to the presence of acid or of acid-reacting bodies. Consequently, we may conclude that the retardation of salivary digestion caused by ordinary alcoholic drinks is in character similar to the retardation which follows the use of vinegar, lemon-juice, or other acid fluids or mixtures, such as salads highly seasoned with vinegar, etc., the only difference being that the latter class are unquestionably more vigorous in their retarding action from their greater degree of acidity. We may, indeed, query whether under normal circumstances in the body the retarding action of all these fluids, alcoholic or otherwise, is quite as great as our experiments would at first glance indicate. It must not be overlooked that the saliva is ordinarily alkaline, the degree of alkalinity in some cases, at least, being equal to 0.08 per cent. of sodium carbonate. With such an alkaline fluid, aided, perhaps, by alkaline food, a portion at least of the disturbing acid of the alcoholic beverage, especially if the latter is not imbibed in too large quantity, may be neutralized and thus deterred from exercising any deleterious influence. Further, the widespread use of effervescent table waters, such as Apollinaris water and others charged with alkaline carbonates, as additions to wines of the claret and hock type, would likewise lead to a diminution of the danger in this direction. On the other hand, the acid alcoholic beverages, especially the sour wines and other liquors with pronounced acid reaction, must always be a menace to the thorough and vigorous digestion of farinaceous foods both by the saliva and pancreatic juice, provided the latter is exposed to their influence. This, obviously, may be a matter of little moment to a vigorous person with abundant digestive resources, but to the weak and ailing individual with scant digestive powers it may be a matter of vital importance.

Summary.

The following summary, in which will be found many repetitions of previous statements, will suffice to make clear the general tenor of our results:

Pure ethyl alcohol, the active agent in all so-called alcoholic liquors, when present in small amount—say 1 or 2 per cent. of absolute alcohol, equal approximately to 2 to 4 per cent. of proof-spirit—has little or no action upon the digestive power of the gastric juice. There is, indeed, a slight tendency for such amounts of alcohol to increase somewhat the proteolytic power of the enzyme—in other words, the digestive power on proteid foods may be slightly increased. As the percentage of alcohol is raised, retardation or inhibition of proteolytic action becomes pronounced, although not very marked until the digesting mixture contains

5 to 10 per cent. or more of absolute alcohol. With 15 to 18 per cent. of absolute alcohol, digestive action may be reduced one-quarter or even one-third. Especially important is the fact that the extent of retardation by a given percentage of alcohol varies greatly with the strength or activity of the gastric juice and with the digestibility of the proteid material. Everything else being equal, the greater the strength or digestive power of the gastric juice the less is the retardation, while, on the other hand, the weaker the gastric juice the greater the inhibitory action of a given amount of absolute alcohol. It is, therefore, impossible to make a general specific statement regarding the action of given percentages of alcohol under all conditions. Our results agree essentially with those obtained by Sir William Roberts, who found that in the presence of less than 10 per cent. of proof-spirit (5 per cent. of absolute alcohol) there was no appreciable retardation of gastric digestion. With 10 per cent. of proof spirit retardation was only barely detectable, while with 20 per cent. retardation was quite distinct. Beyond this point the inhibitory effect of alcohol increased rapidly.

On the proteolytic action of the pancreatic juice absolute alcohol exercises a more marked influence, the presence of even 2 or 3 per cent. being sufficient to produce a distinct retardation of digestive action. Still, as in the case with gastric digestion, the exact amount of retardation is greatly dependent upon the digestive power of the pancreatic fluid. When the amount of absolute alcohol present in the digesting mixture is less than 1 per cent. the inhibition of proteolytic action is very slight, provided the ferment is fairly vigorous in its action.

On the digestion of farinaceous foods by the saliva absolute alcohol has no very marked influence. With active saliva not greatly diluted the presence of even 5 per cent. of absolute alcohol may lead to a slight increase in digestive power. Larger quantities of alcohol cause retardation of amylolytic action, but even 10 per cent. of absolute alcohol causes only a slight retardation. As this percentage of absolute alcohol is equal to at least 20 per cent. of proof-spirit, it follows that pure alcohol, free from admixture, is not liable to interfere materially with the digestion of starchy foods by the saliva nor presumably by the pancreatic juice.

Strong alcoholic beverages, such as whiskey, brandy, rum, and gin, containing ordinarily about 50 per cent. of absolute alcohol and with only a small amount of solid or extractive matter, have an action upon gastric digestion practically proportional to the quantity of alcohol present. Thus, with a vigorous gastric juice, the presence of even 10 per cent. of whiskey results simply in a slight retardation of digestive action. The same is true of brandy, gin, and rum. With a weak gastric juice the retarding action is much greater. When digestive action is fairly vigorous the presence of small percentages of whiskey causes practically no retardation; indeed, there is even a slight sugges-

tion of increased digestive action in the presence of 3 per cent. of whiskey, much the same as was observed in the experiments with absolute alcohol. In the presence of 20 per cent. of whiskey, on the other hand, digestive activity may be reduced one-fourth, and when the gastric juice is very weak from scarcity of the active ferment, then even small amounts of whiskey may exercise a very marked retarding effect upon the digestive process. Such retardation of gastric digestion as whiskey, brandy, gin, and rum produce is connected mainly with the presence of alcohol or other volatile matter contained in the liquor, the solid matter present in the fluid not showing, as a rule, any evidence of responsibility for the inhibitory action. The conclusion is obvious that pure whiskey, brandy, rum, and gin are no more deleterious to gastric digestion than corresponding strengths of absolute alcohol, and, further, that in the healthy individual these liquors can be considered to impede the gastric digestion of proteid foods only when taken immoderately and in intoxicating doses.

With reference to the composition of whiskey as bearing upon possible variations in the action of this fluid on gastric digestion, our results show merely a variation in the percentage of alcohol present, suggestive of more or less addition of water. The few results obtained by us in this direction show variations in the percentage of alcohol ranging from 30 to 50 per cent. There was likewise some variation in the quantity of tannin present, but in no case was the amount of the latter large.

As to so-called fusel oils, our results show that the higher alcohols, supposedly contained in such oils in small quantities, tend to increase rather than decrease the proteolytic action of the gastric juice. Thus, methyl, propyl, isobutyl, and amyl alcohols all increase somewhat the digestive power of the gastric juice when present in small amount. Large quantities have a decided inhibitory action. Plainly, however, if these alcohols are common impurities in whiskies, brandies, and related liquors, they do not exercise any deleterious influence upon the proteolytic action of the gastric juice.

On pancreatic digestion whiskey is quite active. The sensitiveness of the pancreatic ferment to this form of alcoholic liquor is quite marked. Further, the retarding action of a given percentage of whiskey is greater than that of a corresponding percentage of pure alcohol, thus indicating the presence of an additional inhibitory substance which is apparently a part of the solid matter of the whiskey and is undoubtedly connected with the acidity of the fluid. Brandy and rum have essentially the same action upon pancreatic digestion as whiskey. Both retard proteolysis quite noticeably, and with both fluids the retardation is somewhat greater than that caused by a corresponding strength of alcohol.

The higher alcohols, such as are present in fusel oils, have a somewhat greater inhibitory action upon pancreatic digestion, *i. e.*, trypsin-proteol-

ysis, than ethyl alcohol; but when it is remembered that these alcohols can be present in whiskey, brandy, etc., only in very small quantities, it is seen that they can exercise very little influence in modifying the action of alcoholic liquors upon pancreatic proteolysis.

On the digestion of farinaceous foods by the saliva whiskey and brandy have no retarding influence when present to the extent of 5 per cent., provided the saliva is not too greatly diluted. Present in larger quantities, or when mixed with weak or greatly diluted saliva, they exert a retarding influence upon amylolytic action which is out of all proportion to the contained alcohol. The inhibitory action is connected mainly with the acidity of the alcoholic fluid, for on neutralization of this acidity the inhibitory action of the liquor ceases. Rum differs from whiskey and brandy in having a somewhat greater inhibitory action, due simply to the greater acidity of this fluid, and is nowise connected with the alcohol present.

The heavier alcohols, viz., amyl, butyl, propyl, etc., all tend to increase the amylolytic action of the saliva when present in small quantity.

Wines, as a class, when present in small amount, have little or no deleterious action upon the chemical processes of gastric digestion. In small amount they may even increase somewhat the rate of digestive action. In larger quantities they have more or less of a retarding effect, which is dependent more upon the character and amount of the solid matter present than upon the contained alcohol. Thus with wines containing 10 per cent. of alcohol the alcohol is of minor importance so far as the influence of the fluid upon the solvent or digestive power of the gastric juice is concerned.

On pancreatic digestion wines have a far greater inhibitory action than the stronger alcoholic liquors. This action, under ordinary circumstances, is almost entirely independent of the content of alcohol, and is very closely connected with the acidity of the fluid. Thus, a strongly acid wine, like a claret with only 10 per cent. of alcohol, has a far greater retarding action on trypsin-proteolysis than a sherry with twice that content of alcohol, but with less acidity.

On salivary digestion wines as a class show a very powerful inhibitory effect, an effect which is due almost entirely to their acid properties. Thus, when the acidity of a wine is neutralized, it loses completely its inhibitory effect on salivary digestion.

Malt liquors in small quantities are without any marked influence on the digestive power of the gastric juice. In larger quantities they cause an inhibition of proteolysis which is entirely unconnected with the small amounts of alcohol present, but directly traceable to the comparatively large amounts of extractives they contain.

On pancreatic digestion the malt liquors as a class exert an inhibitory effect which, however, is not very pronounced. The retarding action is

due mainly to the character of the solid or extractive matters present in the liquors, and is practically unconnected with the content of alcohol. The inhibitory action of malt liquors is far less pronounced than that of wines.

On salivary digestion malt liquors have a very great retarding effect, especially when the saliva is quite dilute. With saliva less diluted the retarding action is far less pronounced. The inhibitory action of these liquors is due solely to their acidity. Remove the acidity by neutralization with an alkali and the inhibitory action disappears.

Finally, it is to be plainly understood that these conclusions apply solely to the influence of the various liquors studied upon the purely chemical processes of digestion—*i. e.*, upon amylolysis and proteolysis. The results recorded do not afford data for drawing any broad or general conclusions regarding the influence of alcoholic drinks upon digestion or alimentation, since they throw no light upon possible modifications of secretion, absorption, or peristalsis. We have now positive data regarding the action of alcohol and various alcoholic fluids upon the digestive action or solvent power of the saliva, gastric juice, and pancreatic juice, the three important digestive fluids of the body; but before we can answer the question, How do alcoholic fluids affect digestion? we must ascertain the influence of these fluids upon the secretion of the digestive juices and upon the absorption of the products of digestion, as well as upon peristalsis, and not until these points have been thoroughly studied shall we be able to understand fully the action of these beverages upon the whole process of digestion.

Bibliography.

Bernard, C.: Influence de l'alcool et de l'éther sur les sécretions du tube digestif, du pancreas et du foie. Compt. rend. Soc. de biol., 1856, Par., 1857, 2 s., iii. 30-32. Also, Gaz. méd. de Par., 1856, 3 s., xi. 295.

Bikfalvi, Karl: Orvas-Termissethrdomànij's értesito. Kolossvár, 1885, 131. Also, *transl.* [Abstr.]: Ueber die Einwirkung von Alcohol, Bier, Wein, etc., auf die Verdauung. Jahresbericht für Thierchemie, 1885, xv. 273.

Blumenau, E. B.: K voprosu o deijstvii alkoholy a na otravlyenia jeludka u zaorovych (Effect of Alcohol upon Functions of Healthy Stomach). 8°, St. Petersburg, 1890, 59 pp., 1 l. Also, *transl.:* Therap. Monatsh., Berl., 1890, v. 504. Also, *transl.* [Abstr.]: Jahresbericht für Thierchemie, 1891, xxi. 212.

Bouchardat et Sandras: De la digestion des boissons alcooliques, et de leur rôle dans la nutrition. Ann. de chim. et phys., Par., 1847, 3 s., xxi. 448

Buchner, W.: Ein Beitrag zur Lehre von der Einwirkung des Alkohols auf die Magenverdauung. Deutsches Archiv f. klin. Med., Leipz., 1881, xxix. 537. Also [Abstr.]: Jahresbericht für Thierchemie, 1881, xi. 286.

Caillol de Poncy, O.: Action du rouge de Bordeaux sur la digestion. Marseille méd., 1886, xxiii. 194-198.

Chittenden, R. H.: Observations on the Digestive Ferments. Medical News, Phila., Feb. 16, 1889.

Duggan, J. R.: On the Influence of Alcohols on the Conversion of Starch by Diastase. Stud. Biol. Lab., Johns Hopkins Univ., Balt., 1884-87, iii. 483-490.

Engesser, H.: Das Pancreas. Seine Bedeutung als Verdauungsorgan u. seine Verwerthung als diätetisches Heilmittel 8°, Stuttgart, 1877, 53 pp. Also [Abstr.]: Schmidt's Jahrb., Leipz., 1878, clxxix. 139.

Gluzinski, U. A.: D zi alanie wyskoku nu cynnosc zotadku ludzkiego tak w stanie fizyolog. jak i patolog. (Effect of Alcohol on Functions of Human Stomach, from a Physiological and Pathological Point of View). Medycyna, Warszawa, 1885, xiii. 349; 365; 386; 402. Also, *transl.:* Deutsches Arch. f. klin. Med., Leipz., 1886, xxxix. 405–430. Also, *transl.* [Abstr.] Jahresbericht für Thierchemie, 1886, xvi. 263.

Hare, H. A.: The Influence of Beer on Salivary and Gastric Digestion. Medical News, Phila., 1887, l. 649.

Hougounenq, L. J.: Recherches novelles sur les vins. [Paris] 4°, Lyon, 1891, 32 pp. Also: Lyon méd., 1891, lxvi. 289–303. Also: Ann. d'hyg., Par., 1891, 3 s., xxvi. 5–21. Also, *transl.* [Abstr.]: Centralbl. f. klin. Med., Bonn, 1891, xii. 693. Also, *transl.* [Abstr.]: Jahresbericht für Thierchemie, 1891, xxi. 212.

Klikowicz, S.: Ueber den Einfluss einiger Arzneimittel auf die Künstliche Magenverdauung. Arch. f. path. Anat., etc., Berl., 1885, cii. 376. Also [Abstr.]: Jahresbericht für Thierchemie, 1885, xv. 276; 1886, xvi. 266.

Kretschy, F.: Beobachtungen und Versuche an einer Magenfistelkranken. Deutsches Arch. f. klin. Med., Leipz., 1876, xviii. 527. Also [Abstr.]: Jahresbericht für Thierchemie, 1876, vi. 173. Also [Abstr.]: Schmidt's Jahrb., Leipz., 1878, clxxix. 121.

Ogáta, M.: Ueber den Einfluss der Genussmittel auf die Magenverdauung. Arch. f. Hyg., München u. Leipz., 1885, iii. 204–214. Also [Abstr.]: Jahresbericht für Thierchemie, 1885, xv. 274.

Penzoldt, F.: Beiträge zur Lehre der menschlichen Magenverdauung unter normalen und abnormen Verhältnissen. Deutsches Arch. f. klin. Med., Leipz., li. 535. Also [Abstr.]: Jahresbericht für Thierchemie, 1893, xxiii. 277.

Petit, M. A.: Etudes sur les ferments digestifs. J. de thérap., Par., 1880, vii. 493.

——— ——— Action of Pepsin in the Presence of Alcoholic Fluids. Journ. pharm. chim., xxx. 467. Also, *transl.* [Abstr.]: Jahresbericht für Thierchemie, 1879, ix. 194.

Portes: Investigations in Artificial Digestion. Journ. pharm. chim., xxx. 446. Also, *transl.* [Abstr.]: Jahresbericht für Thierchemie, 1879, ix. 194.

Roberts, William: Collected Contributions on Digestion and Diet. London, 1891, Smith, Elder & Co.

Schellhaas, H.: Beiträge zur Pathologie des Magens. Deutsches Arch. f. klin. Med., Leipz., 1884–5, xxxvi. 427. Also [Abstr.]: Jahresbericht für Thierchemie, 1885, xv. 271.

Schütz, E.: Einfluss des Alkohols und der Salicylsäure auf die Magenverdauung. Also [Abstr.]: Jahresbericht für Thierchemie, 1885, xv. 272.

Uffelmann, J.: Studien über die Verdaulichkeit der Kuhmilch und über die Mittel ihre Verdaulichkeit zu erhöhen. Arch. f. d. ges. Physiol., Bonn, 1882, xxix. 384.

Watson, W. H.: Notes on the Effect of Alcohol on Saliva and on the Chemistry of Digestion. J. Chem. Soc., Lond., 1879, xxxv. 539.

Wolff, Ludw.: Beiträge zur Kenntniss der Einwirkung verschiedener Genuss und Arzneimittel auf den menschlichen Magensaft. Ztschr. f. klin. Med., Berl., 1889, xvi. 222. Also [Abstr.]: Jahresbericht für Thierchemie, 1889, xix. 266.

Wolffhardt, R.: Ueber den Einfluss des Alcohols auf die Magenverdauung. [Erlangen.] 8°, München, 1890, 12 pp. Also: München. med. Wochenschr., 1890, xxxvii. 608–611. Also [Abstr.]: Jahresbericht für Thierchemie, 1890, xx. 247.

REVIEWS.

SYSTEM OF SURGERY. Edited by FREDERIC S. DENNIS, M.D., Professor of the Principles and Practice of Surgery, Bellevue Hospital Medical College; Visiting Surgeon to the Bellevue and St. Vincent Hospitals; Consulting Surgeon to the Harlem Hospital and the Montefiore Home, New York; ex-President of the American Surgical Association; Graduate of the Royal College of Surgeons, London; Member of the German Congress of Surgeons, Berlin. Assisted by JOHN S. BILLINGS, M.D., LL.D. Edin. and Harv.; D.C.L. Oxon.; Deputy Surgeon-General U. S. A. Vol. III. Surgery of the Larynx, Tongue, Jaws, Teeth, Salivary Glands, Neck, and Chest. Diseases and Surgery of the Eye and Ear. Surgical Diseases of the Skin. Surgery of the Genito-Urinary System. Syphilis. New York and Philadelphia: Lea Bros. & Co., 1895.

THIS volume continues the valuable features of the excellent series, and maintains the high standard of its predecessors. Perhaps there is greater scope given to individual opinion in some sections than in others; but, notably in that portion devoted to Genito-urinary Surgery, where the fullest expression is given to personal views, very copious use is made of the work of others, with the addition of the ever-useful reference.

The absence of these references may be said to be the defect of the article on the Surgery of the Larynx and Trachea. Beginning with a brief mention of the simpler clinical conditions, the author, Dr. Delavan, proceeds to the discussion of those which more strictly concern the surgeon. The serious nature of many conditions of the larynx and trachea is not always recalled, and the gain through aseptic and antiseptic methods is not so striking as in some other portions of the body. Wounds of the trachea are more fatal than is often supposed. The death percentages given are 24 for large, 52 for small, and 40 for gunshot wounds.

The O'Dwyer tube is expected to play an important part in the future treatment of fracture, œdema, stricture, and perichondritis of the larynx. Intubation methods are clearly presented. Ten seconds is the time given for the whole procedure.

The tearing away piecemeal of nasal polyps is considered absolutely contraindicated. In the treatment of chronic hypertrophy of the tonsils the cutting operation is decidedly favored, contrary to the teaching of many authorities, who have discarded the tonsillotome.

Dr. Henry H. Mudd writes of the Surgery of the Mouth and Tongue. Under the head of epithelioma of the tongue it is remarked that the removal of a part or even of the entire tongue is not especially difficult nor dangerous, and the operation should be made earlier in order to improve the present rate of mortality and recurrence. A number of valuable tables represent the causes of death after operation, the percentage

of recurrence, its periods, and the like, in 583 cases. One suggestive table gives a much lower mortality for the knife or scissors than for the electro-cautery or the galvano-écraseur. In 51 deaths by acute post-operative infection the percentage is not materially influenced by the presumably antiseptic surgery since 1880.

An interesting chapter is devoted to the Salivary Glands.

The important surgical region of the Neck is considered, first from the standpoint of development, after which various injuries, diseases, and growths claim attention. The work deserves praise in that material is not duplicated where classification of general subjects is somewhat conflicting. It would add greatly to the convenience of reference were volume and page to be given instead of the annoying reference "elsewhere," though this is a defect common to works whose separate volumes are published at intervals.

In the chapter on Injuries and Diseases of the Chest, very careful attention is given to lesions which affect the thoracic contents. The occurrence of hemiplegia is noted from washing out the chest-cavity with cold fluids after aspiration. The results of pneumonotomy are considered very encouraging, considering the circumstances. The technique of the operation from behind for the removal of foreign bodies from the œsophagus and bronchi is reproduced in the words of a monograph by Dr. J. D. Bryant. His valuable diagrams are given.

The Diseases of the Eye are admirably presented by Dr. de Schweinitz, while the operative surgery of that organ has been assigned to Drs. Henry D. Noyes and John E. Weeks.

The Surgery of the Ear has advanced in interest since the importance and frequency of mastoid disease have been more fully recognized. Careful consideration is given to this subject and to brain-abscess. For the opening of the mastoid cells the chisel is advised.

Half the volume is occupied with the Genito-urinary System, comprising as full a consideration of this most important field as is contained in many special works Dr. J. William White writes on the surgery proper and on gonorrhœa.

A pertinent subject is that of floating or movable kidney. Attention is called to the fact, often overlooked, that the true floating kidney is congenital, has a mesonephron, and lies within the peritoneal cavity. Extremely few cases have been recognized before death. A valuable discussion is given of the suppurative lesions in and about the kidney, with many references. Stress is laid upon the tendency of perinephritic abscess to travel upward, and many cases are referred to in which this has given rise to serious error or obscurity. Liberal use is made in the chapter on Ureteral Disease of the writings of Fenger and others who have contributed to the knowledge of this subject. The conclusions of this author are given in full. The status of the cystoscopic examination of the male bladder is intelligently presented. "It can be hardly said to have advanced the surgery of the bladder as far as might be at the first glance imagined. Beyond the early diagnosis of new growths the greatest service which the cystoscope can render to the surgeon is to demonstrate exactly the source of hæmaturia or pyuria when it is suspected that one of the kidneys is diseased." Its use "by untrained observers is both mischievous and misleading." The more favorable views of Meyer are also given. Not the least striking feature of the modern discussion of cystitis is the wholesome regard which the surgeon has come

to feel for the cleanliness of catheter and sound. The author regards nitrate of silver as the mainstay in the treatment of chronic cystitis.

Among operations for vesical calculus in children, litholapaxy is considered to be the best, perineal lithotomy having now a very limited field. So in later life litholapaxy is to be first thought of.

Barling's tables of operations between 1888 and 1892, as compared with Thompson's for the years between 1790 and 1840, show that the general mortality of stone-operations is reduced, and that the reduction is due to the greater safety at present after fifty years of age, but they "appear to show also unmistakably that operations for stone in children are attended with a greater mortality than they were fifty years ago." This is considered to be due to the suprapubic section.

The author advocates with a certain amount of partisan vigor the claims of castration for prostatic hypertrophy. His reiteration of the supposed analogy between this procedure and oöphorectomy for fibroid uterus seems hardly consistent with later knowledge of the behavior of uterine fibroids after removal of the ovaries, and of their growth after the menopause. It is because the results upon fibroids have been so unreliable and unsatisfactory that removal of the ovaries has been largely abandoned in favor of perfected methods of hysterectomy, particularly in America. The operation of orchectomy must claim for itself better grounds than this analogy, which is superficial, after all. In the curative treatment of hydrocele of the tunica vaginalis, preference is given by the author to the iodine-injection method. In congenital hydrocele, however, radical operation is preferred.

The best prophylactic for gonorrhœal rheumatism is the employment of the urinary antiseptics, salol, boric acid, benzoic acid, and quinine.

In the article on Syphilis, Dr. R. W. Taylor places himself among those who believe that chancroids are in some cases simply septic ulcers. He states that there is no specific virus, and the ulcer may be readily generated *de novo* at the will of the experimenter from various and the most different sources. Chancroids may occur in men from irritated simple erosions in women. "It must be clearly understood that chancroids may be found on the penis of a man, and that examination of the woman with whom he has cohabited may show her to be free from these lesions." He thinks that innocent women may be cruelly wronged by suspicion even when chancroidal ulcers have been contracted from them. "It is not very uncommon to see chancroids in men who have had no sexual exposure whatever" (page 891), due to dyscrasia, etc. Contagion through contact with objects is considered quite rare, however, though common in syphilis. The general treatment of the subject of venereal diseases is comprehensive and very satisfactory.

The present volume will increase the value of the series and will not be the one least frequently consulted by the physician. G. E. S.

THE THEORY AND PRACTICE OF COUNTER-IRRITATION. By H. CAMERON GILLIES, M.D. Pp. xii. 236. London: Macmillan & Co., 1895.

WE cannot but admire the hardihood of an author who, in these days of seeking after strange therapeutic gods, has the patience and energy to search the medical past to learn what is said of an old practice in order

that a new theory shall be evolved, to the end that a rehabilitation of it shall be brought about. Equally do we admire the faith of the publishers that the much-perplexed practitioner will be so far interested in bygone medical history that their venture shall be a profitable one. Yet with much that is new demanding our experiment and study to determine if it be true, we confess that we have become so much interested in this book that it has received a most careful perusal. We agree with the author, in his preface, when he says that he likes the plan of his essay very much, and we go still further than he in liking its execution still more. The plan is briefly a first part, Historical and Critical; the second, Practical—even more so than the average physician or surgeon would care to admit. In the first part we find much with which we are familiar, the theories, the conjectures of practitioners long since dead, and their authority equally dead so far as its influence upon the mind of the practitioner who lives in the elegant therapeutics of the present is concerned. The dust-covered shelves of the library have been ransacked, and in the main the statements are correct. We note one glaring exception. Granville's lotion (p. 29) was not kept a mystery, nor need we impute any unprofessional secrecy to his work, as does the author. As to what the lotion was we need only to refer to the *Medico-Chirurgical Review* of 1838—the same year in which appeared *Counter-irritation, its Principles*—vol. xxxiii. pp. 472 and 476. To the best of our knowledge a formula known as Granville's lotion has been in use in this country for more than half a century. We can, perhaps, find an explanation of the interest of the author in the old-time lore when we read the rather unnecessarily interjected diatribe against vivisection (pp. 76 *et seq.*). At times in his reasoning he lays himself open to the charge which he brings against others (*cf.* pp. 96 and 89). In regard to checked skin-diseases causing mischief (p. 97), we have held the opinion that such a statement indicated rather the inability of the practitioner to cure them. On pp. 107 *et seq.*, the new theory is presented. Irritants get a fuller supply of appropriate nourishment into a part by stimulating the local circulation and so accelerating nutrition, and on p. 125 begins a chapter devoted to the use of so-called counter-irritaton. In all points the subject is clearly stated. We note inelegancies of expression—p. 34, "pile" apparently meaning an accumulation of wealth; p. 153, "albumins, sugars, and loads of other things appear in the urine,"—which should not be found in a scientific work. On the whole, we expect that the study of this book will bring about a re-introduction of an old, but at present neglected method of relief and cure, but with its limitations better defined and its possibilities well ascertained. R. W. W.

PREGNANCY, LABOR, AND THE PUERPERAL STATE. By EGBERT H. GRANDIN, M.D., Consulting Obstetric Surgeon to the New York Maternity Hospital; Consulting Gynecologist to the French Hospital, etc., and GEORGE W. JARMAN, M.D., Obstetric Surgeon to the New York Maternity Hospital, Gynecologist to the Cancer Hospital, etc. Illustrated with forty-one photographic plates. Philadelphia: The F. A. Davis Co. London: F. J. Rebman, 1895.

IN the present volume the writers conclude their discussion of Obstetrics, having previously written regarding Obstetric Operations in an

interesting volume already reviewed in this JOURNAL. The present book has been designed to deal with facts only, giving no space for the discussion of theories. There are no references to the literature of the subject, and the book is a personal expression of the beliefs of the writers. It is illustrated from photographs of patients, many of which are clear and interesting. The make-up of the book and the manner in which its illustrations are reproduced are not of the best; binding and type are not substantial and clear, while the authors' photographs have been reproduced in an indifferent manner. This is to be regretted, for the subject-matter of the book deserves a better dress.

The work naturally begins with the diagnosis of pregnancy, and here attention is rightly called to the fact that the most important positive sign of pregnancy is found in changes in the contour and consistence of the uterus. In examining patients, the writers have found it entirely unnecessary to uncover the abdomen, but have the patient lie quietly with the field of examination covered by a thin sheet. This has been our custom, and we are glad to find that others have experienced its convenience and its acceptability to patients. In computing the duration of pregnancy the writers very wisely call attention to the liability of error, and suggest that the date at which the uterus sinks is often a point of value in estimating the time of labor. In dealing with the pathology of pregnancy we do not find that importance laid upon impaction of the uterus in the pelvis—often the result of improper clothing—which our experience has impressed upon us. First in importance in the treatment of these cases is a thorough and careful vaginal examination to determine the presence or absence of abnormal positions of the uterus. We recall cases of marked anterior displacement of the pregnant womb in which posture was not sufficient, but in which reposition and the use of the wool pessary gave prompt relief. In treating of the toxæmia of pregnancy the writers lay more stress upon the renal condition than we think is justifiable. Too much stress, we think, is laid upon increase in the amount of albumin present, and too little upon measurement of the amount of urine passed and estimation of its urea and solids. The writers speak in no uncertain way regarding the treatment of ovarian cysts complicating pregnancy. So soon as diagnosticated, these tumors should be removed. Placenta prævia is spoken of under the title of "Vicious Insertion of the Placenta." The writers' classification is exceedingly simple, but two varieties of attachment out of the normal being recognized. The writers believe in interfering in all threatening cases by emptying the uterus without having recourse to the tampon and the use of ergot. There is no question that in their hands the results of such procedure would be good. In the hands of the average practitioner who has intelligence enough to practise antisepsis we have seen success follow the use of the tampon.

The writers' classification of positions and presentations is original, but does not, we think, simplify the subject. We do not recognize the propriety of making several presentations of the vertex, for we do not see how there can be but one presentation of this portion of the fœtus. The presenting part may occupy a number of positions, and this is what is evidently intended in the language of the writers. Under the head of what are usually spoken of as shoulder presentations, the writers speak of presentations of the trunk.

In treating of labor the writers speak of the fœtus as engaging in the

cavity of the pelvis. This description has a practical bearing when the indications for the use of forceps are considered. If the instrument is not to be applied, as is held by most obstetricians, until the head is engaged, and engagement takes place in the cavity of the pelvis, then the use of forceps when the head is within the pelvic brim, but has not descended into the cavity of the pelvis, can scarcely be justified. We doubt if this is the meaning of the writers, for the use of forceps is not uncommon when the head has engaged within the brim, and has not yet descended into the cavity of the pelvis. The writers' description of the abnormalities of labor is clear and interesting, and we note with pleasure the fact that abnormalities in labor are considered as variations from the normal mechanisms, and are not treated as separate varieties of labor.

The clinical course of labor is given in a very practical and thorough manner, and here again some of the most important complications are considered in connection with normal delivery. We are heartily in accord with the writers when they say that "labor should never be deemed completed until lesions are looked for by touch and inspection."

The section upon the management of labor is written wisely and well. The value of anæsthetics, the choice of an anæsthetic, antiseptic precautions, are given with great clearness. During the first stage of labor, especially if prolonged, we do not allow a patient to drink and eat as she pleases, but prefer to have her take concentrated nourishment at regular intervals. The writers choose the dorsal position for delivery, and adopt a method of supporting the head, inserting, if necessary, the index-finger in the rectum. This procedure we have never found advantageous, preferring to place the patient upon the side, and supporting the head by the fingers passed between the mother's thighs and guarding the perineum by the palm and fingers of the right hand. We prefer, for many reasons, not to insert the finger into the rectum of a patient during labor. The writers do not favor twisting the membranes into a cord, a procedure which is generally found unnecessary. In checking post-partum hemorrhage the value of the intrauterine tampon is emphasized, and also the usefulness of strychnine by hypodermatic injection. Posterior rotations of the occiput are to be managed by manual correction under anæsthesia whenever possible. This is certainly the wisest course, and failing in this, as the book advises, the physician may hope for spontaneous rotation when the head reaches the pelvic floor. In dealing with face-presentations a similar advice is given. In delivering the after-coming head great stress is laid upon downward traction upon the shoulders, assisted by suprapubic pressure. If the occiput be brought well under the pubes, there will be little difficulty in delivering the face over the perineum and pelvic floor. Stress is laid upon the resuscitation of asphyxiated infants by flexing and extending the trunk of the child in a rhythmical manner. This and the Schultze method are considered the best of all. The treatment of the puerperal period enjoins careful antiseptic precautions, and allows the woman to sit up occasionally after the fourth day. The writers estimate the milk-plant of value in producing a free flow of milk, and recommend its use in strong infusions. In preparing a bottle for an artificially fed child, boiled milk is to be employed, with gelatin and arrow-root. To this cream is added. A pinch of salt is advised, or a little bicarbonate of soda. These directions are scarcely up to the general accuracy of the book, and we are surprised to find boiled milk recommended in the modern feeding of

infancy. The book treats in an excellent manner of puerperal septic infection. The directions and indications for the various forms of treatment are well and clearly given.

The indications for curetting, and the conditions under which curetting must not be done, are very plainly set forth. Puerperal insanity and puerperal tetanus are considered as varieties of infection.

The book is of a convenient size, and its entire absence of padding, its clear and reasonable statements, make it a work of value to the practitioner of obstetrics. There is always room for difference of opinion upon non-essential points, and a positively written book excites such differences in the mind of the reader. This we believe to be one of the good results which follow the reading of such a book, for such challenge the belief of the reader, and oblige him, if candid, to prove his faith in matters scientific. We have read this book with great pleasure, and prize highly this expression, in permanent form, of the skill and experience of its able writers. E. P. D.

MANUAL OF GYNECOLOGY. By HENRY T. BYFORD, M.D., Professor of Gynecology and Clinical Gynecology in the College of Physicians and Surgeons of Chicago; Professor of Clinical Gynecology in the Woman's Medical School of the Northwestern University; Professor of Gynecology in the Post-Graduate Medical School of Chicago. Containing two hundred and thirty-four illustrations, many of which are original. Pp. xii. 488. Philadelphia: P. Blakiston, Son & Co., 1895.

THE scope of this attractive little book is defined in the preface as being intended not only as a complete manual for the student, but also "an adequate exposition of the subject to the older general practitioner, who recognizes the impropriety of an attempt on his part to manage the more complicated cases, or to perform the more difficult operations belonging to gynecology." In order to accomplish this dual object the portions intended for the student are printed in larger type than the paragraphs intended for more advanced readers.

In glancing over the work we are impressed with two excellent features —the clearness and conciseness of the author's statements, and the fact that the book is not a mere compilation from larger works, which one usually expects in a manual at the present day, but represents the results of his own practical experience. Viewed in this light it deserves more than a passing notice. The six introductory chapters (Part I) furnish a good example of the large amount of useful information which can be compressed within a few pages by one who knows just what the student needs. The chapters on Gynecological Technic (we note with approval the first use of the correct substitute for the prevailing term "technique") are models of clearness and common sense, as well as Chapter VI., on the After-treatment of Operative Cases.

The arrangement of the subject-matter in the body of the work is somewhat different from that usually followed. Part II. treats of Anomalies of Development (including a short chapter on Chlorosis!); Part III. of Functional and Nervous Diseases (why "diseases"?); while the seven succeeding divisions are devoted to traumatic lesions, displacements,

inflammatory lesions, genital tuberculosis, malignant diseases, tumors of the female genital organs, and a concluding section on ectopic pregnancy and hæmatocele. This arrangement is sometimes a little confusing, and the transition from one topic to another necessarily abrupt; but, on the whole, it is novel, and, like other new things nowadays, correspondingly interesting. Seventy-two chapters are rather a liberal allowance for such a small volume, especially as some of them are less than a page in length; but it must be confessed that this arrangement, as well as the rigid subdivision of topics, is an advantage for purposes of recitation.

More attention is paid to hysteria and neurasthenia than is usual in even the larger text-books. The chapter on the latter subject contains an excellent *résumé* of the "rest-cure." The chapter on the Perineum includes brief but excellent descriptions of the typical operations. The operations for the repair of genital fistulæ are less satisfactory. In the last paragraph of the chapter on Laceration of the Cervix, confusion is introduced by reference to "Schrœder's modification of Emmet's operation." The two operations are entirely distinct, as well as their indications.

We are glad to note that anteflexion is not regarded as a true displacement (though included under this heading), and that in this condition "pessaries are, as a rule, more harmful than beneficial."

Part VI. on Inflammatory Lesions (an unfortunate term) includes inflammation of the urinary tract. Cystotomy receives rather faint praise in the treatment of "chronic persistent cystitis."

The author's views on uterine pathology may be criticised by gynecologists of the more advanced school. Our old friend, "Areolar hyperplasia," presents its familiar face, and the recommendation on page 296, to cauterize the endometrium with chloride of zinc "in the more chronic cases," recalls the heroic age of gynecology.

The writer at least shows the courage of his convictions in retaining the chapter on pelvic cellulitis, which has become nearly obsolete in modern text-books. In the chapter on cancer of the cervix uteri there is a good working description of vaginal hysterectomy with clamps.

Part IX. is decidedly novel, as it treats of non-malignant tumors of the entire genital tract, malignant neoplasms not being regarded as "tumors" Undue prominence is given to the palliative treatment of uterine fibroids from the modern surgical standpoint, though doubtless this is of advantage to the practitioner.

The transition from cystic tumors of the external genitals to ovarian cystomata is somewhat abrupt, even in a purely clinical work. Varicose veins and condylomata are included under the general heading of "tumors." The association of papilloma of the external genitals, Fallopian tubes, and ovary might lead the inexperienced reader to infer that they were identical in their origin and pathological importance.

As we have before stated, the book represents the mature experience of an excellent clinical teacher, who knows what is best suited for the student and young practitioner. It is honest and conservative in its teaching, and while we cannot accept its pathology as being strictly up to date, from a clinical standpoint it presents many attractive features. The style is terse and clear, useless matter is rigidly excluded; in short, it combines the best features of a good working manual. H. C. C.

A Manual of Organic Materia Medica: Being a Guide to Materia Medica of the Vegetable and Animal Kingdoms. By John M. Maisch, Ph.M., Ph.D., Late Professor of Materia Medica and Botany in the Philadelphia College of Pharmacy. Revised by Henry C. C. Maisch, Ph.G., Ph.D. Sixth Edition, with two hundred and eighty-five illustrations. Pp. viii. 526. Philadelphia and New York: Lea Brothers & Co., 1895.

We welcome this familiar book, solid both in contents and in mechanical execution, and once more read the authoritative descriptions and comments. Many books have appeared, which have been intended to fill either partially or completely the field occupied by this work, yet it is to Maisch that we turn as the court of last resort. This edition, revised by the son, presents but comparatively few changes, because of the accurate work and advanced scholarship of the lamented father; however, the last revision of the Pharmacopœia has necessitated the addition of some new matter, both in the text and as illustrations. The official drugs are distinguished, according to the preface, from the unofficial by the size of type, yet we find in large type, and, therefore, presumed to be official, Asarum, p. 137, Thuja, p. 288, and Ignatia, p. 361, which are unofficial.

We are not quite ready to believe that the chemistry of aconite is sufficiently exact to indorse the formulas as given on page 145. We note errors in orthography, p. 356, jequiriti for jequirity; p. 322, limon for limonum; p. 331, Aleppy for Aleppo; some variations in the same, as p. 214, ursone, p. 238, urson; p. 214, hydrokinone, p. 329, hydroquinone. The composition of strophanthus, p. 364; cod liver oil, p. 474, are hardly in accord with the latest investigations. On p. 93 it is stated that pelosine is identical with beberine and buxine; on p. 172 bebirine is identical with buxine and pelosine. In the first quotation berberine is undoubtedly intended, the alkaloid of hydrastis and berberis, in the second beberine is the corrected spelling which is not identical with buxine and pelosine. Of other errors we would note the unfortunate one of Cassiæ for Cassia, which is found in the preface. For the botanist and pharmacist the classified differential identification of cellular drugs is unexcelled, the arrangement of the matter is such that easy reference and accurate information are obtained. The illustrations, as a rule, illustrate and are inserted with good judgment. The syllabus of the official volatile oils is hardly so full of information as other portions of the work, and is almost the only section in which we have been disappointed in not finding the facts sought for. In the Table of Drugs Arranged According to Origin, we note the omission of some official representatives of animal origin, as cod-liver oil; but we commend the author for his table of drugs of vegetable origin, which gives in simple manner and compact form the family relationship of the source of the remedies of our daily practice. We congratulate the editor and publishers, that our old familiar friend has still further advanced in matter without increase of bulk, and that it will retain and quite likely increase the honor and popularity which have been secured by the previous editions.

R. W. W.

THE PRACTICE OF MASSAGE; ITS PHYSIOLOGICAL EFFECTS AND THERAPEUTIC USES. By A. SYMONS ECCLES, M.D. Aberd.; Member of the Royal College of Surgeons, England; Fellow of the Royal Medical and Chirurgical Society, and Medical Society, London; Member of the Neurological Society, London, etc. Pp. x. 377. London: Macmillan & Co., 1895.

OF books and papers on massage there had seemed to be a lessening. We might infer either that the profession is fully alive as to what could be gotten from its employment, or that interest in the subject had abated owing to unrealized expectations. We had inclined to the latter belief perhaps because massage was either a *dernier ressort* in the practice of the average physician, or that it was employed as a universal panacea. So when this book came to our table we determined to study it thoroughly, not so much because we expected to find new or startling truths, but because we were already acquainted with the writings of the author, a clinician of no mean ability. We hoped to be spared the recital of cases which would tax the credulity of the faith-curists and to meet with clinical reports such as our own Weir Mitchell might indorse; nor have we been disappointed. To be sure, some of the cases which are narrated are not in good taste, but for candor the book can be commended. It is something more than a treatise upon massage. Let him who doubts this carefully read Chapter V. on the Disorders of Digestion, and then note the care with which the cases were studied. We are quite surprised to find clarified neat's-foot oil (p. 208) recommended as a lubricant, for we had believed that if one were necessary vaseline would be preferable, and, further, that the best practice dispensed with one altogether. As matters which mar a book generally to be praised, we would cite the case found on p. 165, where it was claimed that all sorts of things were found in the motions, legs of "daddy-long-legs," bits of sewing-thread with knots upon the ends, and seeds, and, since seed-fruit had not been lately eaten, the suggestion that the bowel had proved more retentive than his memory. The originator of the raw beef and hot water treatment hardly deserves being designated as "Salusbury" (p. 109), although he might from this ingeniously weave a theory that his practices were conducive to health. We quite agree with the strictures of the author upon the method of Thuré Brandt. This is a book upon massage by a well-informed clinician; it is definite, intentionally fair, recognizing its limitations, and a really valuable work for the physician. For all that it presents nothing really novel, its matter appeals to us as well worthy of our study.

R. W. W.

PROGRESS
OF
MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Antitoxin and Spermine.

Dr. G. E. Krieger writes of the relation of these drugs to natural chemism, and believes that the following conclusions are justifiable: 1. The reaction caused by pathogenic germs is a leucocytosis. 2. The effect of leucocytosis in a normally alkaline blood is the production of active principles from the cell-nuclein, the representation of which is spermine. 3. The effect of intra-organic oxidation is to cause an increase of vital resistance, or a certain degree of immunity. 4. It is possible to aid this physiological process of protecting the organism by the introduction of the serum of animals which have produced antitoxic elements, or directly by injections of spermine. The latter seems especially indicated in diseases in which the elimination of this physiological stimulant has been observed, and the employment of this remedy, which always causes increased cellular activity, is advised in every instance when an infection or even a depressed condition exists. The effect obtained in a number of diseases which, according to recent discoveries, seem, like the so-called infectious diseases, also to be based upon parasitic influence—as ascending spinal paralysis, poliomyelitis, tabes dorsalis, and sclerosis—certainly encourages further experiments.—*Notes on New Remedies*, 1895, No. 2, p. 17.

The Treatment of Gout.

Dr. Kolisch states that it is undeniable that a urate diathesis exists in the gouty condition, but the preceding morbid changes in the physiological disturbance appear to be due to the breaking up of nuclein ($C_{29}H_{49}N_9P_3O_2$) and the formation of alloxurine bodies ($C_4N_2H_2O_4$). The complex chemical change results in uric acid ($C_5H_4N_4O_3$) and xanthine bases ($C_5H_4N_4O_2$), which are comprehended under the term alloxurine bodies. Earlier investigation shows that a combination of diseases of the kidneys and uric acid

increases the elimination of these alloxurine bodies. In each one of the urate diatheses there is a greater amount of nuclein broken up or decomposed, which increases the fragmentary products or lower bodies of the series. We may therefore look upon nuclein and its decomposition as the chemical body which produces the characteristic symptoms in gout from a diseased kidney. According to this view, the alkalies are useful; an excess of albuminoid food must be guarded against, as this form of diet rapidly increases the leucocytosis in the alimentary canal, which finally augments the nuclein product. A moderate use of albumin is not contraindicated, yet tissues, rich in cellular matter, such as nuclein, should be avoided. Boiled meat may be allowed, since the kidneys eliminate the noxious extractive material, but the soup prepared from this meat should not be allowed. Carbohydrates are harmless, and fat may be used as a substitute for albumin. Everything in the vegetable kingdom may be allowed, excepting asparagus, which is absolutely forbidden. Alcohol should also be prohibited. Overexertion in daily exercise should be carefully guarded against, because this greatly increases the splitting up of the nuclein.—*Medical Press and Circular*, 1895, No. 2954, p. 625.

Dr. Jaccoud believes that in the treatment of non-articular gout an exclusively meat-diet will increase the uric acid and for that reason be hurtful. On the other hand, an exclusively vegetable diet will hasten arterio-sclerosis, the most formidable complication which can happen to the gouty, because this is the basis of the renal, cardiac, and cerebral lesions. The mixed diet should be prescribed, the most complete sobriety, and the most perfect regularity in the meals. Truffles, shell-fish, salt-water fishes, pork, and game are absolutely forbidden. Farinaceous food is not allowed if the patient tends to become obese. For liquids, water, white wine well diluted—for the French contain too much alcohol—and Moselle wines. Beers containing a low percentage of alcohol, French or that of Vienna, can be allowed. The strong beers—Munich, Nuremberg—are forbidden. Coffee and tea can be used in moderation. The only *régime* to be permitted is that under which the urine is abundant in quantity and of a specific gravity below the physiological normal. If at the end of a fortnight the patient does not improve, a partial milk-diet should be ordered, a quart of milk between meals, in two or three portions. If, in spite of this, sufficient improvement is not obtained, drugs must be employed. The preference is lithium benzoate, six to twelve grains in the day, generally as pills of one and one-half grains, taken at meals. After each pill a small quantity of an alkaline mineral water can be taken. This is continued for a fortnight; then it is omitted for at least a week. Piperazin and piperazidin are not more valuable than lithium. When the gouty are but slightly obese and suffer from the abdominal plethora of old writers—intestinal catarrh with constipation—in addition to the mixed diet and milk, it is necessary to administer Carlsbad salts alternately to lithium; the natural crystallized salt is preferable. The evening before, a hot solution can be made, which can be taken the following morning after taking care to agitate it once or twice. During eight days a teaspoonful in a half-glass of water should be taken. At the end of three or four days, rarely before, a laxative effect is obtained. The treatment can be omitted for five or six days, when ten days of treatment with lithium should follow; then after five

days the Carlsbad salts are repeated. The thermal springs are of the greatest importance for gouty patients who have not suffered from articular lesions. For those who have suffered, two months should elapse before they make use of them. Carlsbad is valuable from its temperature and large amount of sodium chloride and sulphate; Vichy, from its sodium bicarbonate. The indications are very different. With uricæmia, intestinal catarrh, flatulent dyspepsia, and tendency to obesity, Carlsbad is to be preferred; for lithiasis, Vichy. Both are contraindicated in even indications of cardiac conditions, and in interstitial nephritis. Other waters, less active and better borne, as Royat or Ems, should be chosen. If there are tophi, we should prefer those which contain more chlorine, of which Wiesbaden is the type, source Kochbrunnen, which can be used for drinking and bathing. For articular gout no water is preferable to it. If this is believed to be too strong, we can resort to the waters of Baden-Baden, which are very warm, or to those of Hamburg, less active because they are cold. The gouty, with a tendency to cachexia, should avoid these waters. Then we can resort to those which may be called waters of *lavage*, Martigny-les-Bains, Contréxeville, Vittel, Evian, cold alkaline waters to which it is necessary to add the lime-sulphur water of Capvern; all these are effective only when taken in large amount—eight to twelve glasses per diem. Since these are cold, they are difficult of digestion and not always well borne. Such also is Ragatz, which contains almost no mineral substance, and of which the dose is four glasses. The water as a beverage is the principal agent in treatment, but the baths are useful in chronic nervous and rheumatic affections.—*Bulletin Général de Thérapeutique*, 1895, 48e liv., p. 553.

The Atropine-group.

Mr. Gordon Sharp notes that no group of bodies is more confusing to the student than the pupil-dilators, hyoscyamine, hyoscine, daturine, duboisine, scopolamine, and atropine. Chemically hyoscyamine appears to be identical with atropine, and pharmacologically he does not know if we can distinguish between them. Duboisine was found to be (about 1878) an impure atropine. Daturine is believed to be identical with atropine by Schmidt and Ladenburg. Hyoscine (Ladenburg's) in 1893 was believed to be identical with scopolamine by Schmidt and Hesse. Scopolamine, according to Hesse, is made up of two bases: one identical with hyoscine and the other isomeric with it, which he proposes to name atroscine. Other and conflicting views are summarized. As the results of his own observations he would say that daturine and duboisine may be called impure atropine. The varying effects obtained by different observers in the case of hyoscine and scopolamine may be accounted for on the supposition that neither is a definite base. Hyoscyamine may be supposed to be identical with atropine. Atropine is the alkaloid of which one knows most, and it may be called the fundamental or representative base; our knowledge permits us to say, at least, that in hyoscine and scopolamine we have a certain proportion of atropine along with a varying proportion of a conversion- or decomposition-product of atropine, and which we may call *a*-tropeine. Instead, then, of multiplying names, we should call atropine what is usually atropine, and get

hyoscine and scopolamine free from any admixture, and have the resulting products by names corresponding to hematropine [?]. Personally, his experience has led him to think that hyoscine, scopolamine, daturine, and duboisine differ little from atropine, although other observers think differently.—*British Medical Journal*, 1895, No. 1825, p. 1547.

The External Application of Antipyretics.

Dr. H. Gillet sums up a consideration of this subject by stating that some physiologists still refuse to believe that the skin can absorb. Practically, applications of guaiacol may be useful in replacing the ingestion or subcutaneous injection of the drug or for completing its effect. Various authors insist upon the necessity of enveloping the surface of application with impermeable dressings to facilitate absorption. The action of the applications varies according to the mixtures employed. Ferrand has used equal parts of guaiacol and glycerin to relieve the intercostal neuralgia of the tuberculous; Championnière, the same for sciatica. This mixture does not irritate the skin; it even covers it with an impermeable coating and the pain disappears within a few hours, and, reappearing, is again relieved. But this mixture has no effect upon the temperature, because the guaiacol is not absorbed. In dose of twenty drops of the drug the temperature is reduced; this reduction persists three hours, it then re-ascends and may even go higher than at first. Further, all patients do not react to guaiacol, and there seems to be obtained a habituation to its use. The results which are reported certainly give good reason for the employment of this new method for reducing temperature.—*Journal des Praticiens*, 1895, 2e semestre, No. 26, p. 406.

Loretin.

Dr. Herbert Snow has studied this organic iodine compound, of which the proper chemical title is meta-iodo-ortho-oxyquinoline-ana-sulphonic acid, $C_9H_4IN.OH.SO_3H$. It is a bright-yellow, odorless, crystalline powder, slightly soluble in water and alcohol. It is used as a dusting-powder, either alone or mixed with calcined magnesia, starch, or French chalk; as collodion (2 to 10 per cent.); in pencils of cocoa-butter (5 to 10 per cent.); in ointment (5 to 10 per cent.); with vaseline or lanolin; and as an impregnated gauze. If dusted on the skin or over a granulated wound, it does not give rise to the slightest irritation nor to any unpleasant sensation. It immediately destroys the bad odor of the most fetid cancerous sore, controlling this in a manner in which no other agent which has yet been tried will do. It has been employed in about sixty cases, mostly operations upon the breast and axilla, and has proved to be an ideal antiseptic and deodorant, with not a single drawback.—*British Medical Journal*, 1895, No. 1825, p. 1549.

Preventive Inoculation against Cholera in India.

Dr. W. M. Haffkine proposes the terms variolization (term employed as in smallpox) for the process of using a virus which is the infectious material taken from a patient affected with the disease, and vaccination for the em-

ployment of a vaccine which is a substance cultivated under conditions which will keep the microbe in a fixed state of virulence. The former is the method of Ferran; the latter is that of the author—the use of a modified virus. He gives two injections; the first is a mild form, and the second, after an interval of five days, is one whose virulence has been strengthened. The full effect of each is not attained until after five days have elapsed, so that the individual is not fully protected until ten days after the first inoculation. The microbe is cultivated under fixed and suitable conditions, and its virulence is known, so that it can be used with certainty and safety. One-twentieth of a culture-tube has been adopted as the standard dose. The amount of reaction is in direct proportion to the dose, and the amount of protection is in direct proportion to the intensity of the symptoms produced. A slight swelling and pain in the side are the usual local signs and there is a slight rise of temperature. He has made 70,000 injections upon 42,179 individuals without a single instance of mishap or accident. After giving statistics in detail, he concludes that in instances where cholera has made the largest number of victims, and when it has sufficiently spread so as to make it probable that the whole population were equally exposed, the result has been invariably favorable to inoculation. Applied during the existence of the epidemic, it tends to reduce the mortality even during the first ten days. The best method is probably to use doses of both vaccines, the second one being kept at the highest strength attainable. In support of his position, Koch is quoted as saying that the protective power of the method is established by the observations collected in India up to now, although further perfection and simplification may be possible. Treatment by antitoxin must be considered a decided success, but it cannot be used as a preventive treatment, as its effects on the system are very rapidly worn out. Neither the antidiphtheritic nor the anticholera serum lasts more than a few days. The treatment stands otherwise in regard to people already affected. His intention is to make use of antitoxic serum, and, in case it fails and there is danger of the patient succumbing before the antitoxin can take effect, its use can be combined with the transfusion of saline fluids. It is possible that the administration of antitoxic serum will mitigate the symptoms and diminish the active protection afforded by the vaccines.—*The Lancet*, 1895, No. 3773, p. 1555, and *British Medical Journal*, 1895, No. 1825, p. 1541.

New Methods in Treatment of Malarial Fevers in Infancy.

Dr. Moncorvo has used phenocoll hydrochloride in doses of from five to thirty grains each twenty-four hours, generally administered in solution, in fifty-five cases. It has been generally well tolerated and has rendered good service in several cases where it is difficult or impossible to administer quinine, but it cannot be said to possess any advantages over quinine in pernicious fevers. In mild cases it is useful and safe, even when the kidneys are somewhat diseased. Asaprol has been easy of administration on account of its solubility, its slightly bitter taste being concealed by an aromatic syrup, as that of peppermint, and it does not give rise to any untoward symptoms. It can be used in dose from five to forty-five grains *per diem*. Eighteen cases

are cited, and in but one case did it fail, and that was also tuberculous, and further complicated by severe broncho-pneumonia. In this case the fever resisted also antipyrin and quinine. In a child who suffered from malaria and chorea, both conditions were relieved by a daily dosage of seventy-five grains.—*Gazette hebdomadaire de Mêdecine et de Chirurgie*, 1895, No. 50, p. 590.

Antitoxin.

Dr. William Hallock Park considers the objections with reference to the treatment of diphtheria, comparing the mortality at the Willard Parker Hospital for the month of January. In 1894 it was 39.6 per cent. (no antitoxin); 1895, 29.4 per cent. (very weak antitoxin, temperature of wards 80° to 85° F.); 1896, 19.4 per cent. (very strong antitoxin, temperature of wards, four days excepted, 70° to 75° F.). There were large numbers of cases of laryngeal diphtheria admitted during 1895, which, after removal of the tube, appeared for a time to be doing well, but later developed a subacute broncho-pneumonia. A larger proportion of patients, however, finally got well than in the previous year, in spite of the complication. In searching for the causes of the increased frequency of these complications, it was found that with a lowered temperature of the ward and by diminishing the overcrowding, the result was obtained that no broncho-pneumonia developed in any patient which was not present on admission. The conclusions at which the writer arrives are: 1. That with serum, strong in antitoxin, and with increased experience, we may hope to save many lives by its early use. 2. That until we can entirely eliminate the use of horse-serum we will observe occasional disagreeable after-effects, but these will be rarely, if ever, of a dangerous nature.—*The Medical News*, 1896, No. 1206, p. 213.

M. Monod reports that the mortality during the first six months of 1895 from diphtheria in 108 cities of France having a population of over 20,000 has remarkably diminished, the average of the corresponding period of the seven preceding years being taken as a standard (2626 to 904). This decrease is attributed to the increasing use of antidiphtheritic serum.—*La Mêdecine Moderne*, 1895, No. 101, p. 783.

Rhus-poisoning.

Mr. George M. Beringer summarizes the various statements which have been made concerning this poison. It is pretty generally admitted that all parts of the plant are poisonous, and at all seasons of the year. The dust shaken from the roots can cause irritation whenever it comes in contact with the skin. As a preventive, washing the face and hands with a solution of hydrogen dioxide has given good results. Hot soda baths are efficacious in treatment, and locally the following lotion is preferred: Granular sodium sulphite, 1; glycerin, 4; camphor water to 32.—*American Journal of Pharmacy*, 1896, No. 1, p. 18.

[Pfaff has isolated the volatile substance known as toxicodendric acid, which has been held to be the active principle causing the eruption. He has found the real active principle to be a non-volatile, readily oxidizing oil which produces the characteristic effects of the poison.—R. W. W.]

Poisoned by Bismuth Subnitrate.

Mr. Gaucher reports four instances of poisoning after its use externally, one of these was fatal. An analysis showed that the drug was pure, so that the symptoms could not be attributed to lead. Three forms of poisoning are observed: 1. The benign form, in which the only symptom is a brownish-violet staining of the gums. 2. The more severe form, in which there is a more or less acute stomatitis, to which a chronic condition succeeds marked by gingival streaking and tattooing of the buccal mucous membrane. (3) The acute phenomena resist all treatment, the affected points ulcerate, and secondary infection follows, which gives rise to general symptoms, more or less severe, as fever, hiccough, vomiting, diarrhœa, albuminuria, to which the patient may sometimes succumb. Bismuth, when used externally, forms a soluble combination with the albuminoid substances which is readily absorbed. On the other hand, when taken by the mouth, the stomach-contents are too feebly acid for making a solution of the drug, and in the intestine the alkalinity makes absorption difficult, and this is increased by its being incorporated with the feces in which it is expelled. Mathieu reports an instance where five drachms of the drug were injected each day for eighty days without producing any symptoms beyond a slight stomatitis with pigmentation of the face recalling that of arsenic.—*Répertoire de Pharmacie*, 1896, No. 1, p. 32.

Bismuth Naphtholate.

Dr. Edmond Chaumier regards beta-naphtol as the best of all intestinal antiseptics, although it has a disagreeable taste. It can be prescribed as a mixture with some bismuth salt or as a combination—beta-naphtol bismuth, which has no burning taste. The last in the alimentary canal decomposes, breaking up into naphtol and bismuth oxide. It is a gray powder, slightly aromatic, and contains 26.5 per cent. of beta-naphtol. In infantile diarrhœa the fetid stools lose their odor, the watery evacuations become thicker, and the green color disappears under the influence of this drug. It can be administered in 2 to 5 per cent. solution in quince-syrup, of which the dose is one teaspoonful. In diarrhœas of larger children and of adults the remedy acts quickly, and with a sufficient dose—75 to 150 grains in wafers—they disappear within one or two days. If the pain is severe, opium may be added. For both infants and adults it is well to continue the remedy for some time after the diarrhœa has stopped. The diarrhœa of the tuberculous is of great importance because it interferes with nutrition, emaciates the patients, causes them to lose strength, and prevents the administration of proper remedies. The remedy has been used as well in the temporary diarrhœa, which in a few days will undo the benefits of several months, and in the chronic form, which is almost continuous and constitutes the principal lesion. In the first case stop the creosote carbonate, the only active and safe drug against tuberculosis, and give naphtol bismuth, not only during the disease, but for several days after. In the chronic cases, when the diarrhœa has existed for several months or years, the abdomen is painful upon pressure and the appetite is very much diminished. After prolonged

use of the drug these symptoms disappear and the creosote can again be administered. In typhoid fever (two cases) the intestinal disinfection was perfect, the tongue was always clean and moist, and the convalescence was brief.—*Journal des Praticiens*, 1895, 2e semestre, No. 12, p. 184.

Antipyrin for Conjunctivitis.

Dr. A. E. Anderson desires to call attention to the value of this drug as a remedy for conjunctivitis, acute, chronic, and granular. He uses a 10 per cent. solution, applying this to the tarsal conjunctiva with a pledget of cotton, taking special care to push the cotton well up into the retrotarsal fold. There follow a momentary sensation of pain and a gritty sensation, causing the patient to blink, which soon disappears. For use at home, thrice daily, a 4 per cent. solution may be ordered.—*Therapeutic Gazette*, 1895, No. 12, p. 863.

Arecoline Hydrobromate.

M. Mouquet, from the results obtained upon two horses, concludes that this drug acts as do eserine and pilocarpine combined, and, further, that its activity is greater than that of these drugs (arecoline produced a salivation at least equal to that of pilocarpine, the dose-proportion being 5 to 40). If its use should become common, it will be cheaper than the latter drug.

Dr. G. Bardet calls attention to the fact that the drug above studied comes nearer to pelletierine than to eserine and pilocarpine; areca-nut has been successfully used as a tæniacide. It is proper, in view of its energetic action, to commence with small doses—one-thirty-second to one-sixteenth of a grain.—*Les Nouveaux Remèdes*, 1895, No. 22, p. 505.

Borax-insufflations in Intestinal Diseases.

Dr. Ferdinand Merkel reviews the literature of intestinal disturbances, especially flatulence, and cites the results obtained by Crämer in obstinate constipation by the use of boric acid. After other methods were found to be ineffective a powder-blower was employed. The nozzle of the instrument, well oiled, is introduced, with gentle rotation, into the rectum and the bulb is quickly and forcibly compressed. This ends the operation. For each insufflation 30 to 60 grains of borax are placed in the rectum. It is important that the calibre of the nozzle shall be at least 9 to 13 thirty-seconds of an inch in diameter and that the capacity of the bulb be sufficiently great to carry the above-mentioned amount into the rectum. The treatment should continue for four to six weeks, but marked improvement is found within the first week, sometimes even after the first insufflation. The effect of each application lasts from five minutes to three hours. In some cases there is no result, but generally within fifteen minutes there is an inclination toward a movement of the bowels. Usually there is a large amount of fecal matter expelled together with considerable odorless gas. The consistency of the stool is also diminished. Naturally, if intestinal atony is also present, other methods may be added—massage, electricity, high water or oil enemata—to secure a complete daily evacuation.—*Münchener medicinische Wochenschrift*, 1895, No. 52, S. 1209.

Sulphonal Exanthemata.

Dr. Max Walters notes the previously reported cases, generally of erythema resembling scarlet fever, and reports two personal cases. He remarks that the eruption is mostly located in the follicles, and thence through confluence the efflorescence spreads, becoming large, reddened areas; in addition, vesicles are noted. On the whole, the resemblance is to scarlet fever, which rarely, also, shows vesicles.—*Therapeutische Monatshefte*, 1895, Heft 12, S. 656.

The Pharmacological Action of Purgatives.

Dr. William Murrell states that one thing is perfectly clear, and that is, that the majority of purgatives derived from the vegetable kingdom belong to the class of cutaneous irritants—*e. g.*, croton oil, gamboge, elaterium. This irritant effect leads, when the drug is taken internally, to increased peristaltic movement and to a rapid evacuation of the intestinal contents. The stimulation may be exerted on the mucous membrane itself or upon the motor ganglia which preside over the contractions of the intestines. Saline purgatives have an enormous advantage over purgatives of vegetable origin in not being irritant. It is probable that most of them act simply in virtue of their bitterness. The intensely bitter taste both of magnesium sulphate and of sodium sulphate is readily appreciated, even in very dilute solutions. Bitters excite the secretion both of the stomach and intestines. Gentian, quassia, calumba, and angustura administered immediately before meals improve the appetite and stimulate the powers of digestion. These drugs fail to act as purgatives because many of them contain astringent principles and they are commonly taken in small doses with sherry or gin, which by dilating the gastric bloodvessels facilitates absorption. The theory that the action of saline purgatives is solely to increase peristalsis is now abandoned. The natural purgative waters do not exert their characteristic action if the patient be confined to bed or less favorably placed for the passage of fluid into the intestines. In these cases the action of the aperient is materially assisted by massage of the abdomen, which facilitates the passage of the fluid through the pyloric orifice. The effect of bitter water upon the stomach is beneficial apart from the purgative action, and it is a common experience that patients whose breakfast ordinarily consists of a cup of tea and a piece of dry toast find that they can eat a good meal and digest it after a glass of Hunyadi Janos water sipped slowly while dressing. With regard to the purgative effect, the bitterness of the water is responsible for its excito-secretory action, whilst its low diffusibility impedes the reabsorption of the fluid. As a joint result of the stimulated secretion and diminished absorption there is a largely increased accumulation of fluid in the intestinal tract, which, partly from the effects of gravity and partly from a gentle stimulation of the peristaltic movement excited by distention, reaches the rectum and produces a copious and comfortable evacuation. Some saline purgatives affect the peristaltic movements so slightly that they are powerless to give the secreted fluid the necessary downward impetus, the result being that there is risk of re-absorption with attendant dangers of griping and discomfort. It is rarely

expedient to employ a single member of this group; much better results are obtained by judicious combinations which occur in the natural purgative waters. In the case of Hunyadi Janos water a half-tumblerful is diluted with an equal quantity of boiling water and sipped slowly whilst dressing in the morning, with the result of one copious and easy evacuation immediately after breakfast. The dose can be regulated to a nicety, and it can be taken month after month without the slightest risk of exciting a catarrhal condition of the intestines.—*Medical Press and Circular*, 1896, No. 2957, p. 25.

Glycerin-suppositories.

Mr. Frank G. Ryan has studied the results of replacing the sodium stearate in these suppositories by agar-agar. If only 50 per cent. of glycerin was incorporated, the product was too elastic and lacked sufficient firmness to be introduced into the rectum. Those containing 75 per cent. could be used without much difficulty, but they did not possess the firmness of those made with sodium stearate. More than the latter named amount of glycerin could not be incorporated, as it tended to separate from the mass on cooling. The formula is: agar-agar, 1; water, 9; glycerin, 30. While these suppositories are not to the same extent affected by exposure, they cannot replace those made with sodium stearate on account of the smaller content of glycerin and their lack of firmness.—*Bulletin of Pharmacy*, 1896, No. 1, p. 15.

Gastro-intestinal Antisepsis.

M. Ferrand administers these drugs in divided doses in order to avoid the formation of masses and consequent toxic symptoms, and to permit of decomposition. Further, the methods which are successfully employed by surgeons should not be lost sight of—the freeing the intestinal canal from fermentable material. Attention should also be called to the value of the variations of urinary toxicity as indicating the success with which the remedies are applied.—*Bulletin Général de Thérapeutique*, 1896, 1re liv., p. 3.

Orexin.

Dr. Holm remarks that the unpleasant symptom produced by the drug is the painful burning sensation in the buccal and œsophageal mucous membrane, which is obviated by its administration in wafers. This applies only to the hydrochloride; the basic orexin can be given in powder. The dose of four grains must not be exceeded and not more than eight grains be administered in one day. Generally one dose is given thirty minutes before the mid-day and the evening meal; for *hyperemesis gravidarum* one powder only before supper. Ten cases are briefly reported, to which twenty-three other cases of inappetence from various causes are added. Of these patients, five abandoned the treatment; in nine the result was good; in twelve an increase of appetite was shown; four gave a doubtful result; in two failure was observed. One of these suffered from tuberculosis and the other from hysteria. In general the statements of Penzoldt as to its power of increasing the appetite seem to be verified.—*Therapeutische Monatshefte*, 1896, Heft 1, S. 11.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,

PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND;

AND

GEORGE DOCK, M.D.,

PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

A Case of Acromegaly.

Mendel has reported (*Berliner klin. Wochenschrift*, 1895, No. 52) an interesting case of acromegaly. The patient was an unmarried woman, twenty-five years of age. At fifteen she developed a goitre, the growth of which was checked by the local use of iodine. At twenty-three menstruation, which had always been regular, ceased, and did not appear again. About that time left-sided hemicrania and temporal heteronymous hemianopsia appeared. The knee-jerk was absent. There were no signs of acromegaly. The conditions mentioned continued unchanged for a year and a half, after which characteristic signs of acromegaly appeared in the soft parts and skeleton. The neck measured 36 cm., the thyroid being enlarged, though the thymus was not. The hemianopsia was unusually striking. From the symptoms present it could hardly be doubted there was a tumor or hypertrophy of the hypophysis. The absence of the knee-jerk is of interest, because it has been only rarely observed in this disease. As there were no other symptoms of disease of the posterior columns, Mendel attributed the absence of the reflex to basal disease of the brain.

The patient had been treated for several months with thyroid tablets without any benefit. For two weeks before the report was made she was given beef-hypophysis to the amount of about two grammes daily. This caused no unpleasant symptoms. The patient could bring her teeth together better than before, and during the last four days of the treatment the knee-jerk had returned on the left side. The further history of the case will be looked for with interest.

The Diagnostic Importance of the Examination of the Fasting Stomach.

Schüle (*Berliner klin. Wochenschrift*, 1895, No. 52) has made some investigations in this subject, concerning which previous researches have been very contradictory. As the term "fasting stomach" cannot be applied to the organ after it has been receiving saliva and pharyngeal secretions, the observations were made on persons at once on waking in the morning. Nine subjects were used, six of whom were trained by previous experiments in the swallowing of the stomach-tube. The result of the experiments was that in thirty-one out of thirty-four trials the stomach contained from 2 to 23 c.cm.

of fluid. This was always acid in reaction, and accordingly contained gastric juice. Free hydrochloric acid was present only seven times. Mucus, bile, peptones, and pepsin were also occasionally present. The cause of the presence of the gastric juice must be sought in the saliva or secretions from the pharynx, which even in the small quantities that are swallowed while sleeping excite secretion.

As to the possibility of a continued hypersecretion the author has no personal experience, but gives the following statements bearing on the question:

If there is a hyperacid secretion in the fasting stomach, even in small quantities, it must be looked on as pathological.

If the fasting stomach contains a larger quantity, *i. e.*, 50 to 100 c.cm., this may be due to a pathological process, but is not necessarily so. Alkaline contents indicate a disturbance of the gastric chemistry.

Perisplenic Blood-cyst.

Von Subbotin (*Wien. med. Presse*, 1894, No. 36) calls attention to a rare disease of the spleen, two cases of which have come under his observation. In one case the patient was a farmer, thirty years old, who for sixteen years had repeated attacks of severe malarial fever, with enlargement of the spleen. Laparotomy was performed, the tumor found adherent to the peritoneum. The tumor was incised, and 1500 c.cm. of dark bloody fluid removed. Microscopically, the fluid showed nothing characteristic except altered blood-corpuscles. The interior of the cyst was smooth and hard. It covered all the outer and part of the inner surface of the spleen. Subbotin thinks the cysts develop from the capsule and not from the parenchyma of the spleen.

The Prognosis in Graves's Disease.

Pribram (*Wiener klin. Rundschau*, 1895, No. 44) has noticed a gradual subsidence of the cardinal symptoms in a large proportion of cases of Graves's disease observed during a long time. In some cases exophthalmus, struma, tachycardia, tremor, and psychic alterations have disappeared, and notwithstanding severe physical and mental exertion have not returned within from ten to twenty years. In such cases complete recovery may be claimed. In one case recovery occurred even after marked dropsy had appeared, and in another after dropsy, erysipelas, pneumonia, albuminuria, and emaciation. Hospital treatment, with rest and care, was often followed by improvement, sometimes by recovery. These facts should be remembered when the operative (or medicinal) treatment of Graves's disease is under consideration.

Changes in the Brain in Cholera.

Tschistowitsch (*St. Petersburger med. Wochenschrift*, 1895, No. 31) makes a preliminary communication on the condition of the brain in Asiatic cholera, based on examinations in cases dying with cerebral symptoms. The observations show that alterations in the brain can be demonstrated in cases dying in the algid stage within twenty-four to thirty-six hours after the onset. The changes are more marked in cases dying in the stage of reaction, or in

patients who have gone into the typhoid condition. The nerve-cells and the bloodvessels are chiefly affected, the neuroglia and nerve-fibres being intact. In the early stages cellular œdema and vacuolization are common. Disappearance of the chromatin, swelling of the protoplasm, or granular degeneration also occurs. The smaller bloodvessels are distended; the perivascular spaces often filled with blood and pigment. Hemorrhages into the brain-substance were not observed, nor was there emigration of leucocytes. There is sometimes granular degeneration of the protoplasm of the neuroglia-cells, though their nuclei are not affected. The changes affect especially the frontal and paracentral convolutions; least of all the occipital convolutions and the cerebellum. The changes, in short, are degenerative and necrotic, rather than inflammatory.

Malignant Endocarditis following Gonorrhœa.

Dauber and Borst (*Deutsches Archiv für klin. Med.*, Bd. 56, p. 257) make an interesting addition to our knowledge of malignant endocarditis following gonorrhœa by the report of a case observed by themselves, and a brief critical reference to the literature of the subject. In their own case, a man of twenty years had acute gonorrhœa, inflammation of the right spermatic cord, para-urethral abscess, bubo, tendo-vaginitis in the hand, and myositis. The heart on admission showed no lesions, but gradually symptoms developed pointing to aortic insufficiency. Septic nephritis and hypostatic pneumonia closed the scene. In the beginning the urethral pus contained gonococci in pure culture (as shown by staining).

Later, these became less numerous and finally disappeared, while other bacteria of various kinds became numerous. It is important to note that symptoms of endocarditis began on the eighteenth day after the appearance of the urethral discharge, at a time when the gonococci were still present. Examination of the blood at various times showed no micro-organisms, except once, no doubt as the result of contamination. The autopsy, made with the necessary precautions, revealed extensive ulceration and vegetations on the aortic valves, with various changes in the heart and other organs not necessary to mention. In the vegetations were diplococci, some of which had the typical form of gonococci and were within the cells. They decolorized after Gram's method, were sensitive to the action of alcohol, and had, in short, all the morphological and tinctorial peculiarities of gonococci. They differed, however, from the latter in the appearance of cultures on human blood-serum. Unfortunately the urethral diplococci were not cultivated. The authors deny that the gonococci caused the endocarditis in this particular case, though they admit the possibility of a gonococcal endocarditis. In all cases cultures are necessary in order to identify the species.

Blackwater Fever.

Plehn (*Berliner klin. Wochenschrift*, 1895, Nos. 25, 26, 27) gives an elaborate report on the so-called "blackwater fever" of the west coast of Africa, the "fièvre bilieuse hématurique," or, in general terms, pernicious fever of that country. This appears to be spreading in the Cameroons, though varying in severity in different seasons. It caused twenty-six per cent. of all

deaths among white settlers since 1890, and made up about one-eleventh of all cases of fever in the district. Negroes are less susceptible than the whites, though not immune; Chinese seem especially predisposed. Individual disposition varies. One attack increases the tendency to future ones. Exciting causes, such as emotional disturbances, care, and anxiety, may often be observed, some interesting examples being cited. The period of incubation is difficult to determine, as the attack usually comes on as a recidive of milder malarial disease. Prodromal symptoms, such as depression, loss of appetite, pain in the back and limbs, may occur and last for several hours to several days. At such times a slight rise of temperature may be demonstrated. In some cases the hemoglobinuric attack comes on in an intermittent or remittent fever of simple type. In contrast to the uncomplicated malarial fevers of the Cameroons, in which an initial chill is usually absent, the blackwater fever is usually ushered in by a severe and protracted rigor. This can occur before or during the rise of temperature or at its acme, and is likely to recur at irregular periods, like the chill of septic fever. The patient is usually restless, anxious, and alarmed, the intellect often slightly clouded. There is rarely stupor in the beginning. The most painful symptoms are nausea and intractable vomiting, with a feeling of oppression in the chest and severe dyspnœa. Often there is formication or numbness of the fingers and toes. In the beginning, or soon after, icterus appears and rapidly increases in intensity. In only one out of thirty-nine cases was hemorrhage recognized during life. The temperature-curve resembles that of sepsis. In severe cases the temperature may be at 104° for many hours, then falling rapidly. Continued fever is rare in whites, but is observed in the complicating pneumonia common among negroes affected with the disease. Temperatures above 106° are rare. Hemoglobinuria sometimes occurs with mild elevations of the temperature. The pulse is frequent (120–140), hard and full; later small, quick, and intermittent. Physical examination reveals a mild bronchitis in some cases; the heart-sounds are often impure. The abdomen is sensitive; the spleen is slightly enlarged in about half the cases. The blood-corpuscles and hemoglobin vary much, the proportions being obscured often by concentration of the blood. Large numbers of macrocytes are found, and microcytes and poikilocytes occur. The urine soon becomes dark red or even black, with a greenish tint. The foam is yellow, the specific gravity high (1030–1032), or in mild cases normal, the reaction acid unless irritation of the bladder causes slight alkalinity. The quantity of urine is diminished, sometimes there is almost complete suppression. There is often irritation of the bladder and urethra. The urine throws down a copious sediment, containing mucus, bladder and kidney epithelium, hyaline and epithelial casts, débris, and granular pigment-masses. Bile coloring-matter and acids cannot be found; albumin is present in large amounts, up to one per cent. The precipitated albumin is colored by hemoglobin, but no blood-corpuscles are found. In other words, there is a "nephritis due to the pathological secretions," and the further course of the disease is much affected by this complication. In mild cases the evidences of nephritis disappear suddenly, in more severe cases the course is protracted and the dangers are the same as those of nephritis from other causes. In a certain proportion of cases death is due to heart-failure, with thrombi; in others to anuria. In some cases

there are mild icterus and albuminuria, though hemoglobin cannot be recognized in the urine. In some cases there is paroxysmal hemoglobinuria. In the blood small unpigmented parasites are found. They are difficult to see, show distinct but rather slow motion and growth. They are stained best in fresh preparations. Gradually an oval body develops, reaching a size equal to one-fourth the diameter of a red blood-corpuscle. This afterward breaks up into five or six small oval bodies, staining best at one pole. These produce a "rosette" body or soon become free and rapidly move away in the blood. Crescents are found, but not constantly. They resemble those found in other localities morphologically, but differ from them in the peculiarity of taking the eosin-stain. Pigment is rarely found free, more frequently within the leucocytes, never in the red corpuscles. Whether the differences in the characteristics of the parasites as compared with those of other places are due to the peculiarities of the soil or indicate a new species, whether related to or distinct from similar forms found in Italy and Java, the author does not undertake to say. The parasite is distinguished clinically by its resistance to quinine, and on account of this and the irritating effects of the drug on the kidneys Plehn gave up the use of quinine in the treatment of his cases. At the same time the tendency to spontaneous recovery in blackwater fever is marked. Chloral and morphine, with sinapisms to the epigastrium, oxygen-inhalations for the dyspnœa, and ether-injections for collapse are the remedies relied on. The nephritis and its results are treated in the usual way. After the disappearance of the acute symptoms quinine is given in gramme doses to prevent recidives. [It is to be regretted that the author has not told more about the parasites. From his description the resemblance to the "unpigmented parasite" described by Marchiafava and Celli is almost complete. The results of post-mortem examinations, and the condition of the parasites in the internal organisms, should have been mentioned, especially so since the author says the parasites form no pigment, but dissolve the hemoglobin, and yet describes the occurrence of pigment in the leucocytes and in the liver and spleen. That the organisms are more resistent to quinine than the larger forms makes the resemblance to those first described in Italy greater, but we do not learn from this paper that Plehn used quinine in an efficient manner, so that his statement as to its inefficiency carries little weight. Regarding the pathology of blackwater fever, the author speaks of it often as a hematuria, but expressly says in other places that it is a hemoglobinuria, and that red corpuscles are never found in the urine; yet it must be a remarkable nephritis in which there is albumin in the urine to the amount of one per cent. with epithelial casts, but no blood-corpuscles. Can it be that the urine was not examined fresh? No doubt the study of pathology on the West Coast is difficult, and the author deserves great credit for the observations here reported. The field is a rich one and competent investigators are greatly needed.]

Physiological Function in Metastatic Cancer of the Thyroid.

Von Eiselsberg (*Archiv für klin. Chirurgie*, 1894, Bd. 48) reports the case of a woman, of thirty-eight years, who developed symptoms of cachexia thyreopriva after the removal of an adenoma of the thyroid. These symp-

toms improved, however, coincidently with the development of a tumor in the sternum, which at first grew slowly, later more rapidly, but especially so during the menstrual periods. After the removal of this tumor typical attacks of tetany appeared. These in turn became rarer and the woman passed into a condition of chronic cachexia thyreopriva. A tumor appeared later on the scapula, but was not removed. The tumor of the sternum proved to be a cylinder-cell carcinoma, some of the tubules of which contained small drops of colloid. From the course of events von Eiselsberg concludes that the tumor of the sternum carried on the functions of the thyroid vicariously —a unique example of a new growth, especially a malignant one, carrying on a physiological function. (The idea that the tumor was an accessory thyroid is rejected.)

Gastric Crises in Diabetes Mellitus.

Grube (*Münchener med. Wochenschrift*, 1895, No. 7) gives the name of gastric crises to the attacks which occur not infrequently in diabetics, coming on suddenly with vomiting, colicky pains, dry and coated tongue, cramp in the legs, and slight fever. Diarrhœa sometimes occurs. The attacks last from several hours to several days. Grube thinks the attacks represent a form of diabetic intoxication in which the vagi are irritated by toxines circulating in the blood. They sometimes appear early in the course of diabetes. Under proper treatment recovery is the rule. The most important thing is to cause copious stools by means of enemata. Hot applications to the abdomen are also useful. The vomitus consists generally of the undigested meal previously taken, and contains free hydrochloric acid. As a prophylactic measure the author recommends the avoidance of strict meat-diet. Grube has used with advantage an extract of beef-pancreas in digestive disturbances of diabetics. (The preparation has no effect on the excretion of sugar.)

Tuberculous Ulcer of the Mouth.

Walter (*Therap. Monatshefte*, February, 1895) reports the following interesting case: A patient with tuberculosis of the lungs and larynx noticed the escape of liquid food through the nose. There was also pain in the left side of the mouth. Examination showed a large ulcer of the alveolar process on the left side, between the first bicuspid and the last molar tooth. There was a large cavity extending into the antrum of Highmore. The edges of the ulcer showed miliary tubercles. The tubercular ulcer arose apparently after extraction of the teeth, the tubercular sputum of the patient being pressed against the raw surfaces in the act of expectoration. Though rare, the possibilities should be borne in mind in the extraction of teeth in tubercular patients.

The Leucocytes in Tuberculosis.

Stein and Erbmann (*Deutsches Archiv für klin. Med.*, Bd. 56, p. 323) contribute a timely article on this subject. They have avoided the more serious causes of error in previous work in the same line by using a larger number of cases—sixty in all, by making very numerous blood-counts, and

by counting more leucocytes than is usually done. In many cases the clinical diagnosis was confirmed by post-mortem examination. In counting the white corpuscles a modification of the method of Thoma was used, in which, instead of counting the corpuscles in the squares of the blood-counter, all those in a number of fields were counted, after estimating the contents of the space covered by the field. For many interesting details the original should be consulted; the following conclusions give the most important results: In beginning phthisis the number of leucocytes is normal. In advanced cases, but where cavity-formation has not taken place, the number is also normal. After attacks of hæmoptysis there is usually moderate leucocytosis, which disappears after the cessation of the hemorrhage. In advanced tuberculosis with chronic infiltration, but where destruction of tissue is slight or has not yet begun, the leucocytes may be normal. Increase of leucocytes is encountered in cases with cavity-formation; in cases with chronic suppuration as the result of carious processes; in final exudative processes; and in cases with hyperplasia of lymph-glands. As regards cavity-formation the following statements are important: If leucocytosis occurs in a tuberculous case in which there is no chronic suppuration and no exudation, ulcerative change, *i. e.*, cavity-formation, may be diagnosed. If in a case with normal leucocytes for a long time an increase takes place, excavation may be concluded. As long as the leucocytes are not increased the existence of a cavity, at least one of considerable size, may be excluded. The cause of the leucocytosis is not the tuberculous poison itself, but a secondary infection, a septic process, which may be the result of various bacteria.

Tabes Dorsalis and Syphilis.

Storbeck (*Zeitschrift für klin. Med.*, Bd. 29, p. 141) has analyzed the histories of 108 cases of tabes in the hospital and private practice of Professor Leyden. Of these, 22 were syphilitic; 23 had doubtful histories; and in 63 syphilis could be excluded. Supposing that half of the doubtful cases were really syphilitic, the result would be 30.6 per cent., which Storbeck thinks is not higher than might be expected from the frequency of syphilis, so that the relation of the two diseases does not seem to him established. The value of the article is increased by the fact that it contains abstracts of the clinical histories of the 108 cases, and also a table showing the percentage of syphilitic cases in tabes according to forty-eight authors, from the 97 per cent. of Déjérine to the zero of Mayer.

Protozoa (Trichomonas) in Sputum.

Schmidt reports three cases from the medical clinic in Bonn in which flagellate protozoa were found in the sputum.

The first case was one of aspiration-pneumonia, following cancer of the larynx. There was slight dilatation of the bronchi. The second case was one of chronic pneumonia and pleurisy and probable dilatation of bronchi, subsequent to the aspiration of a splinter of bone. The third case was one of bronchiectasis of long standing.

In all the cases the protozoa were found only in the "Dittrich's plugs,'

in variable numbers. The average size was that of a pus-corpuscle. The form was usually oval or long and irregular. The protoplasm was granular, whether from ingested bacteria the author could not be certain. A nucleus could rarely be seen except in dead specimens. At one end were from one to four flagella in lively motion, and extending back from these, about half the length of the body, an undulating membrane. At the opposite end of the body was a pointed tail, which sometimes served as an organ of support. Schmidt also noticed amœboid motion and the formation of pseudo-spods, which appeared at various parts of the body. The name trichomonas pulmonalis is suggested, though the author admits the species may be the same as that found in the vagina. Staining was not successful, nor could the parasites be cultivated. The organisms disappeared in the second case as the condition improved. Schmidt looks on the parasites as non-pathogenic.—*Münchener med. Wochenschrift*, 1895, No. 51.

The Relation between the Acidity of the Gastric Juice and the Acidity of the Urine.

Mathieu and Treheux, after reviewing the work of others on this subject, give the following conclusions as the result of their own observations:

1. There is a relation between the acidity of the gastric juice and the acidity of the urine.

2. The more acid is produced in the stomach, either from normal secretion or food-fermentation, but especially from the fermentation of milk, the more the excretion of acid by the urine, during digestion, is increased.

3. Under normal conditions the acidity of the urine diminishes considerably during the three to five hours following digestion, and later increases again. This diminution in acidity may be preceded by a passing increase during the first hour of digestion, as if a certain amount of acid was immediately passed on with the ingested fluids and rapidly excreted.

4. As a rule, there is an almost absolute parallelism between the curves which represent the relative acidity (acidity per 1000) and the absolute quantity of acid excreted. This parallelism is wanting when a certain degree of polyuria exists after a meal; the curve of the relative acidity is then elevated, whilst that of the absolute acidity is depressed.

5. When a notable quantity of acid secretion is removed from the stomach, either by vomiting or lavage, this removal is followed by a notable diminution in the acidity of the urine. The urine may become alkaline under these conditions.

6. The average quantity of acid eliminated hourly by the urine is higher in those with increased acidity of the stomach-juice than in those with diminished acidity.

7. The ingestion of milk notably increases the quantity of acid excreted by the urine; this is due, without doubt, to the fact that milk rapidly gives rise in the stomach to the formation of a notable quantity of lactic acid, and that this acid is rapidly carried to the kidneys on account of the increased diuresis.

8. It is not yet possible to trace the curves of urinary acidity during digestion in such a manner as to be able to diagnose the chemical variety

of dyspepsia present. It seems very probable that such curves cannot be traced.

9. It is necessary to exclude milk from test-meals given prior to the study of these curves. The test-meals must be identical in all cases.

10. The cases studied must be submitted to a constant *régime* during a sufficiently long time, as we have seen beer consumed the day previous sensibly elevate the proportion of acid found.—*Archives Générales de Médecine*, November, 1895.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY AND GERMAN HOSPITALS;

ASSISTED BY

ALFRED C. WOOD, M.D., INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

AND

C. L. LEONARD, M.D., ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

SOME INTERESTING STATISTICS ON THE RADICAL CURE OF HERNIA.

In the *Revue Médicale de la Suisse Romande*, STENSSON and ERDMANN report one death in 106 operations for the radical cure of hernia. The death occurred on the tenth day. The autopsy showed acute enteritis and nephritis.

Macewen, in 98 operations, reported one death, which was due to scarlatina.

Bassini had one death after 250 operations. The fatal result was due to pneumonia which supervened after the wound was entirely healed.

Kocher (second report) records 119 operations with one death, which was caused by pulmonary embolism on the fifteenth day. Lucas Championnière reports 266 operations with two deaths—one from internal strangulation, the other from pulmonary congestion.

Kocher (third report) relates the cases of 192 patients on whom were done 220 operations without a death.

As to the recurrences, Lucas Championnière has had 17 recurrences after 275 operations, but only 141 of the patients had been seen more than two months after the operation.

Kocher reports 15 recurrences after 220 operations, 174 of the patients having been seen some considerable time after operation.

Bassini has had 7 recurrences out of 149 patients seen six months after operation.

Macewen knows of but one recurrence after 98 operations.

The danger of the operation is from infection and intestinal and pulmonary complications. The principal cause of recurrence seems to be that tendency to abnormal laxity of tissue that was the original etiological factor.

Where recurrences happen the whole benefit of the operation is not lost.

The recurrent hernia comes down slowly, is small and reducible, can be easily retained by a bandage, and usually causes no pain.

The Effect of Resection of the Vasa Deferentia on the Prostate.

Guyon, at the Ninth French Surgical Congress (reported in *La Médecine Moderne*, October 23, 1895), announced his experimental and clinical observations as to the influence of section of the vasa deferentia on the prostate.

In dogs, he says, after careful experiments, the effect of bilateral section of the deferentia on the prostate cannot be compared with that produced by double castration. Section of the vasa deferentia produces some effect that may in time equal that of castration, but the difference after three months between the prostate affected by the two operations is very striking.

In three cases of urinary retention from prostatic hypertrophy the section of the deferentia seemed to bring relief, but the diminution in the size of the prostate was scarcely noticeable.

He admits that careful catheterization or a *sonde a demeure* may sometimes ameliorate the condition of patients suffering from prostatism quite as much as did these operations, and confesses that at most it is not a radical cure, but a palliative operation.

Varicocele and its Treatment.

Dardignac, in *Revue de Chirurgie*, September, 1895, reports eighteen cases of resection of the scrotum for painful varicoceles. When the varicocele was double or very large, badly stretching the scrotal tissues, the resection was bilateral. In three of the cases consequent hæmatoma required the cutting of stitches to relieve tension, but these were the only untoward events in the series. Most of the cases were done three to five years ago, and though the patients have since been actively employed, some of them not wearing a suspensory, there has been no recurrence, and the patients express themselves as perfectly satisfied with their condition.

Mammary Tuberculosis.

Gaudier and Peraire, in *Revue de Chirurgie* for September, 1895, add the report of three new cases of mammary tuberculosis to the thirty-nine that have so far been reported in medical literature. All three were only finally diagnosticated by the presence of the tubercle-bacillus. In one of the cases a pleurisy, in the other an old coxalgia, would have aroused suspicion as to the etiology of the breast-tumor, but otherwise there were no clinical manifestations to differentiate it from malignant disease. Usually tuberculosis of the mamma runs a slower and more insidious course than any of the forms of cancer, but in one of these cases its rapid development caused suspicion of a fulminant malignant neoplasm.

Age seems to have very little influence. One of the patients was twenty years, one twenty-six years, and the third forty-two years.

In none of the cases was there any history that would point to any etiological influence of the puerperium, of lactation, or of trauma in the production of the condition.

Rapid and Easy Method of Transplanting the Ureters into the Intestine without Suture by Means of a Special Anastomosis-button.

Dr. Achille Boari describes his button and the technique for its use in *Il Policlinico*, October, 1895. Up to this time the objection to the implantation of the ureter in the intestine has been the fear of ascending infection of the kidneys by intestinal micro-organisms. Giordano and Vignoni have each succeeded in keeping dogs alive for some months after transplantation of the ureters to the rectum, and Chaput has transplanted the ureter in the human female to the descending colon with perfect success and no serious after-complications. The patient is in good health—three years after operation. Chaput says "the passage of the urine into the intestine causes no inconvenience, does not disturb digestion, or irritate the mucous membrane. It only provokes rather frequent stools, but not oftener than the normal urinations. It is not necessarily followed by either hydronephrosis or pyelonephritis from ascending infection, as my observations show." Two additional successful cases after the use of the button are reported by its inventor, in which the button came away on the eighth and twelfth days respectively. In neither has there been any signs of uræmia since the operation.

Intractable Vomiting Cured by Pyloroplasty.

Prof. Agostino Paci, in *Il Policlinico*, October, 1895, reports a case of vomiting, which was slowly but surely threatening the life of the patient from inanition. After every other means had been tried in vain, an operation on the pylorus was suggested as a last resort. The condition found was stenosis of the pylorus, with extensive adhesions to surrounding structures, caused by an old perforating ulcer. The pylorus was incised and the longitudinal incision made transverse by stitching, thus securing tissue for the re-establishment of the lumen of the pyloric orifice.

The post-operative course of the patient was uneventful. No liquid or food of any kind was allowed for four days, then nutritive enemata were given. On the fifth day some broth was given. On the seventh day an egg was allowed. The patient has not suffered since from any of the former obstructive symptoms.

Disappearance of Dysuria in Cases of Enlarged Prostate after Castration.

Albarran (*Le Mercredi Médicale*, November 6, 1895) suggested before the Ninth French Surgical Congress, October 21st, that the immediate alleviation of the urinary symptoms after castration and the notable decrease in the size of the prostate that can be demonstrated within a few hours after the operation may be due to the depletory effect of the operation on the abnormal congestion of the gland that exists in hypertrophy.

The benefit is rendered permanent by a true atrophy of the prostate that takes place later. The extent of alleviation depends upon the capability of the bladder-walls to regain their normal contractility. Where this has been organically impaired through the long continuance of the pathological pro-

cess some of the symptoms of dysuria will remain. M. Legueu, in the discussion, reported two cases of castration for prostatism, one without any relief, and without decrease in size of the prostate: the other followed by absolute disappearance of all urinary symptoms.

Suture of Accidental or Operation Wounds of Large Venous Trunks.

M. Ricard reported (*La Presse Médicale*, November 6, 1895) before the Ninth French Surgical Congress two cases in which by suture of large venous trunks he had succeeded in preserving the continuity of the vessels.

In the first case, the brachio-cephalic, he employed the Lembert suture and supported the vein by suturing tissues carefully above it.

In the second he sewed up an incision in a dilatation of the femoral, with four stitches, "just as if it had been an ordinary wound," and then stitched the skin above it.

The union in both cases was perfect. There was neither hemorrhage nor consequent disturbance of the circulation, so that the lumen of the vessel seems to have been left free.

Eighty Cases of Lithotrity.

Albarran, of Paris, announces in *Le Mercredi Médicale*, November 6, 1895, the statistics of eighty lithotrity-cases in his personal experience. There was but one death, though in more than two-thirds of the cases the bladders were infected and in some there was pyelonephritis.

There were 46 phosphatic calculi, 29 uric acid, 4 urophosphatic, and 1 oxalic.

Of the patients, 20 were over seventy years and 7 were over seventy-eight years. The oldest was eighty-four years, and was operated on successfully without an anæsthetic, because of aortic valvular disease.

Five of the patients were females—one a girl of ten years. The only death in the series was due to anæmia, in a man of sixty-one years, on whom the operation was done without incident and occupied but twenty minutes, the calculus being of uric acid of but medium size.

Surgery of the Lung.

Paul Reclus, at the Ninth French Surgical Congress (*La Médecine Moderne*, October 23, 1895), reviews this subject and concludes:

1. That surgical interference in tubercular cases must be proscribed.
2. In primary cancer no conditions can occur in which pneumonectomy would be feasible.
3. As regards cavities, incision is sometimes a justifiable palliative measure.
4. Resection of a portion of the lung for hemorrhage is a last resource; that its success in three reported cases requires the surgeon to bear the procedure in mind.
5. Hydatid cysts, gangrene, and abscess are all benefited by incision. The intervention in these cases is radical and often saves the life of the patient.

Circumstances under which Chloroform is Preferable to Ether as an Anæsthetic.

Gay, in commenting on anæsthetics (*Boston Medical and Surgical Journal*, 1895, No. 18), says: "Sulphuric ether, under ordinary conditions, is as safe as can reasonably be expected of any agent which produces such beneficent results; that chloroform is safe in a vast majority of instances, but that fatal accidents do occasionally occur under circumstances in which they were not anticipated, and that these accidents can neither be foreseen, prevented, nor remedied; that under rare conditions no known anæsthetic is entirely free from danger; that the greater comparative safety of sulphuric ether is slowly being recognized, and hence that its use is gradually displacing, to a certain extent, its more potent and more dangerous rival." The relative safety of these two agents, as just expressed, the writer thinks is decided as surely and as firmly by an intelligent and searching experience of half a century as it is possible to decide any scientific point.

As is well known, however, chloroform is to be preferred for certain cases. These the author indicates in a general way, as follows: "All operations liable to be attended with spasm of the glottis, œdema of the larynx or lungs, profuse secretion of fluids in the air-passages, and tonic contraction of the muscles of respiration, all cases requiring tracheotomy and œsophagotomy, as membranous croup; laryngitis, acute, chronic, traumatic, specific, or tubercular; œdema of the larynx or glottis; malignant disease of the throat and neck; deep cervical cellulitis; deep tumors of the neck, as bronchocele; foreign bodies in the air-passages; foreign bodies in the œsophagus; bronchitis in the aged; asthma; and, finally, in cases liable to be complicated by difficult or suspended respiration.

On Penetrating Wounds of the Spinal Cord.

Enderlen (*Deutsche Zeitschrift für Chirurgie*, Bd. xl. p. 201), as a result of experimental studies on animals (rabbits), comes to the following conclusions:

1. The degeneration of the spinal cord after a wound is not localized to the point of the lesion, but extends to adjacent parts.

2. The extension of the degeneration is not always uniform; that is, there does not appear to be any rule governing the process; however, the more extensive the lesion, the greater the extent of degeneration.

3. In the course of time the number of swollen axis-cylinders decreases, but they may be found for a comparatively long time (thirty-fifth day).

4. In consequence of the lesion there is an increase in the neuroglia.

5. The gray substance assumes its normal condition in a short time, above and below the wound; there is seen an increase of the ganglion-cells; in the region of the wound these cells degenerate.

6. Independently of the point of lesion there are points of degeneration in the spinal cord, partly on the side of the puncture, and partly in the other half.

7. As regards the arrest of degeneration in the several fibres, it will be found that in many cases the posterior fibres are already free, while in other

tracts there are still swollen axis-cylinders and wide gliameshes. In a few cases the opposite may exist.

As regards the swelling, the author noted its presence two hours after the wound. He could find no instance of regeneration after injury.

The author also injected fresh blood above and below the dura, and also introduced small particles of kidneys beneath the dura, and found degeneration as a result. This he did not think due to pressure, but to disturbance of the circulation, either active or passive.

The clinical part of the paper included 67 collected cases. The lateral swelling and softening of the cord are more extensive than would be supposed on pure anatomical grounds. If certain paralytic symptoms disappear during the progress of the case, it is due to subsidence of swelling and vicarious function of tracts that remain intact.

The Relation of Trauma to Malignant Tumors.

Ziegler (*Münchener med. Wochenschrift*, 1895, No. 27 u. 28) reviews the facts concerning the relation of single and repeated trauma to malignant tumors. His paper is based on the statistics of the last five years in the surgical clinic in Munich. It includes 171 cases of carcinoma of the breast, 44 of the lips, 37 of the scalp, 46 of the cavity of the mouth, 9 of the penis, 9 of the extremities, and 12 of the alimentary canal; 34 sarcomas of the head and neck excluding the jaws, 24 of the jaws, 29 of the mammary gland, 3 of the abdominal wall, 6 of the kidneys, 8 of the testicles, 23 of other parts of the body, and 44 of the extremities. In all there were 328 cases of carcinoma, 117 in men and 211 in women; and 171 sarcomas in 81 men and 90 women. After deducting the tumors of the mamma and genital organs, there were 108 tumors in men and 102 in women. In carcinomas there was a history of single traumas fifty-five times. Ninety-two times there had been chronic conditions of irritation. In sarcomas thirty-five times a single trauma was noted, and thirty-two times (including warts) chronic irritations were at fault. Although some cases of single traumata seem to stand in doubtful relation to the formation of the growth, the author believes, as a rule, the new formation has been brought about by the injury, basing his judgment on the continuation of the pains and swellings after the trauma and which go insensibly into the formation of the tumor.

Such a high percentage for the single traumata, 25 per cent., and for the continuous irritation, 18 per cent., leads Ziegler to adopt Virchow's irritation-theory. In the production of tumors, every factor should be taken into account, and the influence of traumata must be considered, no matter what theory of tumor-formation one accepts.

The subject is of special importance when the relation to medico-legal proceedings and to accident insurance is considered.

On the Influence of Ether and Chloroform on the Kidneys.

Eisendrath (*Deutsche Zeitschrift für Chirurgie*, Bd. xl. p. 466) reports 130 cases of narcosis, 70 of chloroform-anæsthesia, and 60 of ether-anæsthesia in which the urine was carefully examined for the presence of albu-

min by heat, nitric acid, acetic acid, ferrocyanide of potassium, and Spigler's test. The centrifugated sediments were examined microscopically. The cases examined were patients without fever, and in whom the urine contained no urates.

In thirteen cases the urine contained albumin before the narcosis; in eight of these there was an increase of albuminuria after the anæsthesia, four times after chloroform and four times after ether. A woman having albuminuria from amyloid kidney was narcotized once with ether and once with chloroform. Both times there was an increase in the amount of albumin, which nearly equalled in each case—from 2.5 per cent. before ether to 10 per cent. after, and from 3 per cent. before chloroform to 9 per cent. after. The increased albuminuria after chloroform lasted longer than that after ether.

In patients whose urine was free from albumin there was albuminuria after ether-narcosis in fifteen instances (25 per cent.), and after chloroform twenty-three instances (32 per cent.). Therefore albumin appeared more frequently after chloroform than after ether. In many cases in which no albumin was found after narcosis, there were found microscopically renal epithelium and cylinders. This cylindruria was equally frequent after both chloroform and ether (28.3 per cent. of the cases), but it disappeared more quickly after the latter.

Juxta-articular Tubercular Foci.

To the multitude of forms in which tubercular disease manifests itself in osseous tissue, Menard (*Rev. d'Orth.*, September, 1895) adds that in which the tubercular focus has its origin in the epiphysis contiguous to an articulation, where it may develop and form an abscess opening externally, without producing an arthritis, or may, and more commonly does, involve the joint, sometimes without a visible destruction of the intervening tissues, and which are never more than slightly affected.

The author cites in detail ten cases involving the extremities of the long bones of both the upper and lower extremity. This form of disease is, however, rare in the hip-joint, probably because of its anatomical relations, and is most common in the extremities of the femur, tibia, and fibula that form the knee-joint.

The treatment indicated is immediate surgical interference, as clinical experience has shown that the opening of the focus of disease prevents the invasion of the joint, and that cicatrization of the original focus is followed by rapid relief and disappearance of any arthritic symptoms that may have been present.

The Treatment of Floating Kidney.

After a complete and exhaustive study of the symptomatology of this condition, Albarran (*Annales des Malades des Organes Genito-urin.*, July, 1895) discusses the different modes of treatment and their application to individual conditions, summarizing his remarks in the following *résumé:*

1. Operate upon all floating kidneys which are the seat of other disease, modifying the procedure according to the condition present.

2. Where mechanical or painful exacerbations of the symptoms are pres-

ent, attempt their relief by orthopedic apparatus. If this is successful, give the patient the choice of wearing the bandage constantly or of submitting to operation. Where the bandage does not relieve operate.

3. In cases having hysterical or neurasthenic complications attempt the cure by bandages, and only operate where they do not succeed.

4. Where enteroptosis is present, if the bandage gives relief, do not operate until symptoms directly attributable to the kidney are so serious as to demand operation. Even after operation a bandage should be worn in these cases.

5. Where there are no acute symptoms the bandage is sufficient and should be advised.

Peritoneal Tuberculosis.

Thomson (*The Practitioner*, November, 1895), in discussing the "Surgical Aspects of Peritoneal Tuberculosis," after having given reasons for discrediting other theories, says: "It does not seem unreasonable to infer that the incision itself is the one constant and essential factor in the curative influence exerted by laparotomy, and that the benefit is due to the surgical interference *per se*, and not to any particular method of interference, nor to any of its incidental accompaniments."

Clinical experience and experimental evidence lead the author to conclude that the beneficial results of surgical interference in peritoneal tuberculosis are due to the making of a wound through the wall of the belly, and the attendant manipulation of the parts concerned.

In discussing the bearing of the above conclusion upon practice, it is not to be assumed that all cases of peritoneal tuberculosis are to be subjected to surgical interference.

In view of the natural tendency to spontaneous recovery, no case should be admitted to operation until medical treatment has had a fair (though not too prolonged) trial. Among the local measures included under this head he is inclined to place most reliance on careful massage of the belly, and on measures calculated to restore the normal functions of the intestine.

The inunction of mercurial or other ointments is probably chiefly beneficial because of the mechanical manipulations concerned, stimulating the tissues invaded by the bacillus to grapple with the latter. The inunction of ointment may be regarded as a gentle and safe form of massage.

The securing of regular and copious evacuations of the bowels by drugs aims at the cure of catarrh, cessation of fermentation-processes, and an increase in the eliminating powers of the mucous membrane. Should evidences of recovery not present themselves the question of operation is to be considered.

In all cases of diffuse serous or purulent ascites operation is very certain to cure and very easy of performance; a free incision is to be made through the belly-wall, the fluid is to be evacuated as completely as possible (turning the patient on one or other side for this purpose). When the fluid is serous the wound is then and there to be closed by suture; it being optional and perhaps advantageous to insert some iodoform into the parts exposed by the incision, rather with the object of preventing tubercular infection of the

tissues of the abdominal wall and consequent breaking down of the scar at a subsequent period, than of influencing the existing peritoneal tuberculosis.

When the fluid is purulent (cold abscess) it is better to insert a drainage-tube within the lips of the wound, and to remove it on the second or third day, when the amount of discharge is no longer sufficient to soak the dressings. To leave in a drainage-tube longer is injurious, as on the one hand it favors the formation of a sinus, and on the other its inner end may, by its mechanical pressure on the weakened walls of the intestine beneath, favor perforation of the latter and formation of a fecal fistula.

In cases of encysted or circumscribed fluid the consensus of opinion points to operative interference as especially indicated in this group, and experience has shown that it is in the majority of cases remarkably successful.

The author concludes from five personal cases and the experience of others that the adhesive type of tubercular peritonitis, while less favorable than the cases in which fluid accumulation is the chief feature, are capable of being favorably influenced by laparotomy, provided there is no serious tubercular lesion elsewhere in the body.

Hypertrophy of the Prostate with Complete and Chronic Retention. Double Castration. Cure.

Albarran (*Annal. des mal. des organs genito-urin.*, August, 1895) reports the following case: Patient, sixty-nine years of age, having good family history, had had four attacks of gonorrhœa. For the past four years he had urinated more frequently than formerly, getting up once or twice in the night. Since the accentuation of this difficulty the patient has been compelled to strain for a considerable time before the urine began to flow. In June of 1894 he had his first retention of urine, which lasted for twenty-four hours. Since that time the number of micturitions had been increased, thirteen times a day, four or five times a night, while the urine has become turbid. In the latter part of December two hypogastric punctures were necessary to relieve him of retention, and subsequently he has been obliged to use the catheter regularly, occasionally passing a small quantity. Catheterism became difficult at the beginning of June.

Condition at the time of operation: The urethra is not markedly indurated or irregular in the penile portion, but the prostatic portion is elongated. The bladder is insensible, though extending to the umbilicus. Rectal palpation showed a moderately hypertrophied prostate, smooth, without irregularities, sluggish to the touch. A soft catheter could not be passed into the bladder. The urine was turbid, contained a slight amount of pus, but no casts. The general condition of the patient was medium, but he had no fever and very little appetite. Regular catheterization with lavage produced very little marked improvement in ten days' time.

The afternoon of the day of the operation the patient passed spontaneously 20 grammes of urine. The next day 200 grammes, then 400, 600, until on the seventh day he passed 1500 grammes. The amount of residual urine after spontaneous urination was on the eighth day 300 grammes, on the eleventh day 180 grammes. From the thirteenth to the twenty-first day it was between 135 and 150 grammes. On the twenty-fourth day it fell to 25 grammes. Since then it has remained between 16 and 20 grammes.

The patient left the hospital on July 20th. He urinated five or six times a day, and once in the night. The residual urine was only 15 grammes. The prostate had diminished about one-fifth of its volume. A soft catheter could be easily passed.

Ligature of the Innominate Artery.

Burrell (*Boston Med. and Surg. Journ.*, August 8, 1895) reported a rare case of ligation of the innominate artery in which the patient lived 104 days after operation. He had been up and about for a number of weeks attending to his affairs, and died of hypertrophy and dilatation of the heart and general arterial sclerosis. The innominate artery was closed and the aneurism had shrunk. The patient might have lived for a long time, so far as the ligation of the innominate was concerned.

The author believes that this case teaches:

1. That a patient with general arterio-sclerosis and an enlarged and dilated heart may be kept under ether an hour and a half, subjected to a severe operation, and recover with little shock.

2. That while the ligation of the innominate artery is not of necessity fatal, yet it will always be an extraordinary operation, fraught with danger from the cutting off of an extensive area of circulation. The removal of the sterno-clavicular articulation, and such a portion of the sternum as may be necessary, makes the performance of the operation more practical and one of relative simplicity and safety.

3. That the absence of pain or marked discomfort following the operation, the complete relief of all the patient's symptoms, and his almost uneventful recovery are remarkable.

4. That the secondary hemorrhages which have occurred in almost all of the recorded cases were undoubtedly due to local sepsis, and that the recovery of this case was due to the accuracy with which it was possible to place the ligatures and to the asepsis.

5. That if the innominate is ligated at all, two ligatures are necessary, one to act as a breakwater by obstructing the constantly recurring waves of blood coming from the aorta.

6. That the collateral circulation was principally established in this case by a downward stream of blood from the right carotid and vertebral arteries into the subclavian artery. That while the fusiform aneurism had shrunken there was very little clot above the second ligature. This would lead him in another case of fusiform aneurism in this situation to ligature the carotid, if possible the subclavian in its first part, and, if practical, the vertebral.

7. That the unique behavior of the first ligature that was applied to the innominate is perhaps the most interesting fact which we learn from this case. When the innominate artery was tied something in the wall was felt to give way. The ligature gradually cut its way through the coats of the vessel, followed by an inflammation in the organization which prevented a secondary hemorrhage, and finally rested, organized, and probably covered with a smooth layer of intima inside the innominate artery. This places a new factor at our disposal as regard final disposition of the ligature.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

The Effect of Alcohol as a Disinfectant in Obstetric Practice.

In the *Deutsche medicinische Wochenschrift*, 1896, No. 6, Ahlfeld and Vahle describe experiments made to ascertain the value of alcohol as a practical disinfectant in obstetric practice. These experiments are in addition to some which they had previously made.

The results obtained by disinfecting the hands with alcohol have been variously assigned to the solvent properties of alcohol upon the fatty tissues, thus allowing bichloride of mercury and other antiseptics to come into immediate contact with bacteria contained upon the fingers. Others have asserted that alcohol does not destroy bacteria, but coagulates the epithelia of the skin, thus hardening them without preventing the passage of germs. It has been found, however, that alcohol destroys bacteria, but that its most efficient action is exerted upon micro-organisms which themselves contain water, or which are found in tissues containing water. By experiment Ahlfeld found that alcohol does not act simply by dissolving fatty substances upon the fingers, because ether, which is a better solvent of fat, is not so efficient as an antiseptic. Experiments with septic germs proved that alcohol exerts a direct influence in destroying virulent streptococci. Upon dried tissues containing bacteria, and upon bacteria from which water had been removed, alcohol exerted but feeble influence. An experiment was made with amniotic membrane to determine the influence of alcohol upon such tissues when wet and when dry; the result demonstrated in a striking manner the prompt action of alcohol when the membrane was moistened. Experiments upon the hands of attendants and nurses demonstrated clearly the value of alcohol as a disinfectant.

Bullet-wound of the Pregnant Uterus.

Prichard, in the *British Medical Journal*, 1896, No. 1832, reports the case of a patient, seven months advanced in pregnancy, who was shot with a revolver in the abdomen. She was admitted to the Bristol Infirmary two and a half hours afterward, in a condition of collapse. The bullet entered three inches above and two inches in front of the right anterior superior spine. There was little hemorrhage and no great distention of the abdomen. The fœtal heart was easily heard. A probe would not pass through the abdominal wall. There was no distinct evidence that the bullet had penetrated the abdomen. Later in the evening the bullet was found half an inch above and five inches behind the left anterior superior spine, and was ex-

tracted under cocaine. As the patient's pulse was increasing in quickness, and the distention of the abdomen was greater, abdominal section was performed. The uterus was found to have been shot through, and accordingly was opened, and a dead fœtus and placenta, both perforated by the bullet, were removed. The uterus was amputated, and the pedicle fixed outside the abdomen at the lower end of the wound. Three coils of small intestine had been perforated; these were closed with silk suture. An artery in the mesentery had been severed, and required ligature. The peritoneal cavity was emptied of blood and clots, and thoroughly washed out with boric solution. Drainage with gauze and a glass tube was employed. The patient survived six days and twelve hours. She had bowel-movements, and a sanguinous fluid, which became purulent, was removed from the drainage-tube. At the autopsy death had resulted from purulent peritonitis in three or four foci, the worst being inside the wound of exit. The intestines were completely sealed. The pedicle was also in good condition. The peritoneum had evidently become infected by the bullet after passing through the intestine. Examination of the body of the fœtus showed that the shot passed through the pleura, diaphragm, and liver.

Rupture of Sac and Death of Fœtus in Abdominal Pregnancy at Full Term, followed by Recovery.

Eagleson reports in the *Journal of the American Medical Association*, 1896, No. 8, the case of a woman, aged thirty-six years, who supposed that she had an abortion at three months, because she suffered from pain, hemorrhage, and the expulsion of a membranous cast of the uterus. This was followed by the development of an enlargement on the right side of the uterus, the true nature of which was not appreciated. Fœtal movements were finally felt, and the heart of the child was heard. She came under Eagleson's observation supposing that she was in labor. The patient's urine contained a large amount of albumin, and she gradually developed eclampsia. It was decided to dilate the uterus and deliver immediately. When the cervix was dilated, the uterus was found empty and but little enlarged. It was evident that the pregnancy was extrauterine. The patient was transferred to the Providence Hospital at Seattle, and abdominal section performed as soon as possible. A dead child was extracted, which had evidently perished some days previously. It was well formed, weighing six and three-quarters pounds. There were but few adhesions of the fœtal sac, and these were easily separated. The placenta was firmly attached to the top and posterior surface of the uterus, and to the right broad ligament. The principal nutrient vessel of the placenta, as large as a small lead-pencil, came from the under surface of the mesentery of the ileum. Commencing peritonitis was present. The abdominal cavity was thoroughly washed with hot boiled water, and a glass tube and gauze drain were inserted. The patient made a good recovery.

The Influence of Toxins upon Fœtal Development.

Charrin and Nobécour, in the *Archives de Physiologie*, 1896, No. 1, give the results of interesting observations upon infants born of mothers who had

developed some pathological condition during pregnancy, giving rise to the formation of toxins in the blood. It was found that whereas a healthy child increases thirty-two grammes each day, an infant born of a tuberculous mother did not gain in weight at all, while the child of a woman who died of tubercle had increased 4.28 grammes for each day. The child of a mother who before confinement had a very extensive phlegmon gained but 5.7 grammes for each day. Experiments upon animals give similar results. The healthy infant loses but a moderate amount through the organs of excretion, while, on the contrary, toxins interfere with processes of nutrition, and often seem to reduce a discharge of harmful waste to a minimum.

Abnormal Labor-pains and Their Treatment.

Schaeffer, of Heidelberg, divides abnormal labor-pains into those which are purely atonic and those which are partially spasmodic in their character. There have been various divisions made of atonic pains, some referring them to the various portions of the uterus, and others dividing them according to the degree of atony which is present. The uterus contracts more frequently when atony is present, but much less effectually. Such pains do not increase in vigor as dilatation advances. The pauses between these pains are shorter than in normal cases. In the latter portion of the period of expulsion atonic pains are more frequent and longer than in normal cases, so that in some patients the same effect is produced, although in longer time, which is obtained by normal pains. The amount of actual work done by the uterus is found by careful observation to be much greater than in cases of normal contraction. The work done by the uterus is most efficient in the first portion of labor; while compensation is wholly or largely effected in the latter part. It is observed that the latter portion of birth in these cases is practically accomplished by contraction of the abdominal muscles, and that these contractions are greatly influenced in a reflex manner by uterine pains. The diagnosis of atonic pains is often neglected, and this condition is mistaken for other complications.

In partially tetanic pains there is no special delay in the rupture of the membranes. The most frequent cause of this condition is endometritis of the cervix, resulting in slow dilatation and increased suffering. Another cause of this condition is frequent examinations during labor, and the irritation which they produce. An abnormal position of the uterus may also produce partially tetanic contractions. The treatment of this condition consists in placing the patient in a favorable posture, in the use of warm baths, and in hot vaginal douches.

For weak pains, where simple atony of the uterus is present, small doses of ergotine, given by hypodermatic injection, are found useful. It was observed to produce an effect in about eight minutes after its administration.—*Centralblatt für Gynäkologie*, No. 4, 1896.

The Clinical Importance of Gonorrhœa during Pregnancy, Labor, and the Puerperal State.

In the *Münchener medicinische Wochenschrift*, 1895, No. 49, Fehling draws attention to the various ways in which gonorrhœa can affect the childbearing

woman, and makes suggestions regarding her treatment. He has seldom found it necessary to treat urethritis occurring from this cause. The patient is directed to drink an abundance of water, and occasionally salicylate of sodium or salol is given. In obstinate cases iodoform-bougies are placed within the urethra. Where vulvitis and vaginitis are present, antiseptic injections produce good result. Normal saline solution and permanganate of potassium are useful in the form of douches. Twice weekly Fehling is accustomed to pencil the mucous membrane with 5 to 10 per cent. solution of nitrate of silver, using iodoform as a powder. Absorbent cotton should be placed between the labia, or compresses wet in lead-water. Where erosions are present upon the cervix nitrate of silver may be used with a camel's-hair pencil. Gonorrhœal salpingitis is treated in the usual manner, by rest, counter-irritants, and morphine. Scarification of the neck of the uterus is sometimes practised where pain is excessive.

Should it be necessary to induce labor in a patient having gonorrhœa, it is well to douche the vagina with normal saline solution, or with an antiseptic if the infection be in an acute stage. In cases where there have been erosion and catarrh of the cervix for a long time, the tissues are rigid and dilatation slow. Douches are often of value; multiple incisions are often required in these cases. No alteration in the placenta has been observed in gonorrhœal patients. Care must be taken with children to use prophylactic applications of nitrate of silver to the eyes. Gonorrhœal stomatitis is rarely seen in private practice, although described in hospitals. Absorption-fever is not infrequent in these cases, and is best treated by vaginal douches; after the first four weeks occasional applications of nitrate of silver are advised to the interior of the uterus. Fehling considers salpingitis not common in these cases, and draws attention to the danger that such a condition will go on with but little apparent disturbance until an abscess in the tube may suddenly rupture, setting up peritonitis. Fehling believes that in the greater portion of cases of gonorrhœal tubes that the contents of these tubes does not contain pathogenic micro-organisms aside from the gonococcus.

Double Ovariotomy during Pregnancy.

In Landau's clinic in Berlin, Mainzer (*Münchener medicinische Wochenschrift*, 1895, No. 48) reports the case of a primipara, four months pregnant, who suffered greatly from pain in the sacral region. Upon examination a tumor was felt, not connected with the uterus, upon each side of the pelvis. These were found to be ovarian and were removed without the interruption of the pregnancy, the patient going to term and being delivered of a healthy child in spontaneous labor.

Gonorrhœal Rheumatism in the Puerperal State.

This rare complication of the puerperal state is illustrated in a case described by Bar (*La Presse Médicale*, 1895, No. 60). The patient was suspected of having had gonorrhœa before labor, and bacteriological examination was made of mucus taken from the vagina. Although gonococci were not found, epithelial cells and other micro-organisms were present. As the gonococcus often disappears in the later stages of gonorrhœa, its absence was not proof

positive against the diagnosis of gonorrhœa. The patient was confined in normal labor, having been seized a few days previously with chills and intense pain in the joints. The articulations were swollen, and over the surface there was an erythematous eruption. The mother's lying-in period was without septic infection, although her joints were successively attacked by pain, swelling, and redness. An examination of mucus from the urethra showed the presence of gonococci. One of the affected joints was aspirated, and its contents allowed to develop upon culture-material, when streptococci and staphylococci were found in colonies. The patient made ultimately a good recovery.

A Successful Symphysiotomy.

Cameron reports in the *Montreal Medical Journal*, 1895, vol. xxiv. No. 6, a successful symphysiotomy in a woman in her second labor. Her first confinement was terminated without especial difficulty, by forceps, with the birth of a small female child. At her second labor the head of the child was very large and firm, and failed to engage at the brim of the pelvis. Axis-traction forceps were used without success. The symphysis was then opened with an ordinary scalpel. The head was then extracted by forceps, considerable force being required. Both walls of the vagina were lacerated, but immediately sutured with silkworm-gut. The child weighed eleven and a half pounds, and survived the operation. The patient also made a good recovery. Six months after the operation the patient was in good health, and walked without difficulty. The symphysis had firmly united.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D., M.R.C.S.,

OF NEW YORK.

Pruritus Vulvæ.

Marain (*Revue internat. de Méd. et de Chir. pratiq.; Centralblatt für Gynäkologie*, 1895, No. 49) recommends local applications of warm chloral solution (1 per cent.) twice daily, 10 per cent. solutions of chloral, corrosive sublimate, 1 to 500, and an ointment containing one part of olive oil, three of menthol, and six of lanolin. If these are not beneficial, the galvanic or faradic current may be applied. Excision of the affected parts is a last resort.

Gonorrhœal Metritis.

Madlener (*Centralblatt für Gynäkologie*, 1895, No. 50) affirms that the gonococcus is able to make its way from the endometrium into the muscular substance of the uterus and to cause inflammation there, which may terminate in abscess-formation. The latter is especially apt to occur during

the puerperium. The inflammatory process is usually localized. The cocci soon disappear from the myometrium, where it is destroyed, or whence it emigrates. The germs may penetrate the entire thickness of the muscular wall and infect the peritoneum without the tube being involved, which explains the occasional occurrence of perimetritis as a sequela of gonorrhœa without accompanying disease of the adnexa.

Repeated Operations in Adherent Tumors.

Jabovlay (*Lyon méd.; Centralblatt für Gynäkologie*, 1895, No. 52) recommends that in the case of tumors, so firmly adherent that their immediate removal would be attended with too much risk, a preliminary operation should be performed at which the adhesions are separated sufficiently to allow the tumor to be drawn out of the wound as in draining an adherent sac. A week later the tumor is removed.

[The description of this method is somewhat vague, and does not make clear the advantages of a second operation.—H. C. C.]

Myoma of the Rectum Simulating Ovarian Cyst.

Westermark (*Centralblatt für Gynäkologie*, 1896, No. 1) reports a case of tumor of the rectum which was diagnosed as ovarian cyst, the error not being discovered before operation. The patient died of ileus, due to intrapelvic adhesions of the intestines, which the writer attributes to the use of the gauze drain. Similar errors in diagnosis were reported by Senn and Berg.

Perforation of the Uterus.

Tait (*Lancet*, August 10, 1895) strongly opposes the idea that in many cases in which the uterine wall is apparently perforated with a sound or curette the end of the instrument really enters the dilated proximal end of a tube. In all his experience he has never seen such a condition in either the normal or pathological Fallopian tube; while, on the contrary, he states that he has observed several specimens in which the uterine wall has become so thinned that it was readily perforated with a sound. Five cases were observed by him in which this accident occurred without untoward results.

Intestinal Obstruction after Cœliotomy.

Ferguson (*Journ. Amer. Med. Assoc.*, 1895, No. 15) reports the case of a patient, aged thirty-seven years, who developed symptoms of ileus four days after double salpingo-oöphorectomy and ventro-fixation. Two days later the abdomen was opened and a loop of small intestine was found adherent to one stump. This was detached, and the patient made a good recovery.

Leguen (*Gaz. Méd. de Paris*, 1895, No. 35) reports four cases of intestinal obstruction following abdominal section, the first of which, due to compression of the colon by a perimetric band, terminated fatally. Autopsy in the second case showed an entire absence of adhesions, obstruction being due simply to paralysis of the gut. In the third a secondary cœliotomy showed the presence of adhesions between the stump and the colon; in the fourth the

intestinal canal was obstructed by a vaginal tampon (!). The writer recommends the administration of laxatives on the day following operation. If symptoms of intestinal obstruction appear, the abdominal wound should be promptly re-opened and the point of occlusion sought for, especially in the neighborhood of the stump. If it cannot be found, an artificial anus should be established.

Vaginal Hysterectomy for Irreducible Inversion.

Franchommes (*Journ. de Sciences Méd. de Lille; Centralblatt für Gynäkologie*, 1896, No. 1) affirms that total extirpation is the most surgical method of dealing with this condition. Two successful cases by Dures are reported, of four and seventeen months' standing. On account of the difficulty of ligating the broad ligaments he recommends opening the peritoneal cavity at once, introducing the finger, and then splitting the anterior uterine wall. The edges of the latter wound are held apart and the broad ligaments are drawn through it, ligated, and divided. The posterior wall of the uterus is then incised, and, lastly, the lateral vaginal fornices. After securing the bases of the broad ligaments the uterus is removed in halves.

Unique Variety of Ovarian Carcinoma.

v. Kahlden (*Centralblatt für Allg. Pathologie; Centralblatt für Gynäkologie*, 1896, No. 1) describes an ovarian neoplasm removed from a young girl, which seemed to have originated from the epithelium of the Graafian follicle. Histologically it showed a large number of small round bodies closely resembling primordial follicles. It could be characterized as an adenoma of the Graafian follicle, without any tendency to cystic formation, from which carcinoma developed by atypical proliferation.

The Early Diagnosis of Cancer of the Uterus.

In a recent discussion on this subject (*British Med. Journal*, February 1, 1896), Thornton lays stress on the responsibility of the general practitioner with regard to the early recognition of malignant disease of the uterus. Important clinical symptoms are the characteristic sacral pain, offensive discharge, and cachexia, "which is often only too apparent quite early." Locally the presence of red, angry nodules in the cervix, which bleed easily and later break down, forming little pits with grayish surfaces and covered with necrotic tissue, is significant. Excision of a bit of suspected tissue for microscopical examination (if a suspicious ulceration fails to heal under the usual applications) should not be resorted to unless absolutely necessary, or unless an operation is to follow shortly, as there is "risk of rapid spread to distant parts through the opened veins and lymphatics."

Griffith (*Ibid*), writing on the same theme, analyzes some of the salient symptoms of early uterine cancer. Hemorrhage, he affirms, is atypical, having no connection with menstruation, except in cases of corporeal disease. Menorrhagia, if present, is usually due to some other cause. A slight hemorrhage without any assignable cause is always significant, especially in a patient not pregnant (or one who has recently aborted or been confined), and

in a woman after the climacteric. The pain of cancer differs from that due to other pelvic troubles in that it is not relieved by rest in the recumbent posture, but is often increased. It is more frequently referred to the region of the trochanters than are other pelvic pains. Vaginal discharge is a late manifestation, and is watery, rarely purulent. In making a different diagnosis it is important to bear in mind the ulceration of the vagina and cervix in working women, due to neglected prolapsus and foreign bodies (pessaries). Hemorrhagic endometritis may simulate commencing malignant disease of the corporeal endometrium. The tendency of a malignant ulcer to bleed at the slightest touch is highly important clinically. Hysterectomy may be performed in doubtful cases, even where the diagnosis of cancer is afterward found to have been erroneous. This is better than to delay radical operation until too late.

[Although the points raised in this discussion are quite familiar, we have thought it useful to cite the views of these well-known specialists in order to emphasize certain errors which we believe should be pointed out. To me, who has made a study of the subject, it is evident that all the symptoms mentioned as characteristic may be absent until a late stage, especially pain, foul discharges, and above all *cachexia*. Moreover, menorrhagia *has* been frequently noted as an initial symptom in young women, though atypical hemorrhages in patients after the climacteric are most significant. Again it is frequently demonstrated practically that the microscope is not always a reliable guide in the diagnosis of malignant disease. These facts cannot be too strongly insisted upon, because the general practitioner is too often lulled into a feeling of security by noting the absence of those typical symptoms which he has been led to believe are invariably present in incipient malignant disease. The history of the majority of cases of inoperable carcinoma of the uterus submitted to the specialist bear out this statement.—H. C. C.]

The Surgical Treatment of Large Uterine Fibroids.

Walthard (*Correspondenz-Blatt für Schweizer Aerzte*, 1896, No. 4) concludes a theoretical paper on this subject, based on experiments on animals, as follows: Secondary hemorrhage in supravaginal amputation is certainly avoided by careful ligation of the ovarian and uterine arteries, with transfixation and ligation of the stump. There is no danger of the stump sloughing if it is tied with catgut or silk. Infection of the cervical stump does not occur from the migration of organisms in the vagina. Ileus is avoided if irritation of the peritoneum (bacterial, chemical, or mechanical) is avoided during the operation, and if all non-absorbable ligatures are made extraperitoneal by stitching peritoneal flaps over the stump.

Drainage of the Peritoneal Cavity.

Gubaroff (*Ibid.*) concludes from personal observations that gauze is the best drainage material, the indications for the use of tubes being "more than doubtful." He admits that the Mikulicz drain is essentially a hæmostatic. The earlier the gauze is removed the better. If the fluid which escapes is colorless and there is no febrile reaction, it may be removed at the end of twenty-four hours.

PÆDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,
OF PHILADELPHIA;

ASSISTED BY

THOMPSON S. WESTCOTT, M.D.,
OF PHILADELPHIA.

TREATMENT OF INFECTIOUS VULVO-VAGINITIS.

AGRAMONTE (*Medical Record*, January 11, 1896) reports a series of thirty-two cases of vulvo-vaginitis in children coming under his observation at Bellevue Hospital. In treatment he properly deprecates any medicine by the mouth, unless it be a mild diuretic, like citrate of potash, or drugs properly addressed to a remote cause or underlying dyscrasia. Enuresis, which he places among the more frequent etiological factors, must, of course, receive appropriate treatment. Whether the urethra be involved or not, the author's routine treatment is directed to the vaginal canal and external parts only; this consists simply of flushing with a solution of permanganate of zinc or potassium (preferably of zinc), of the strength of 1 to 3000. The mother is instructed (the first time practically taught) to insert into the vaginal canal, for a distance of one or two inches, a soft rubber tube of a thickness appropriate to the age of the child, the other end being connected with a fountain syringe or by siphon with an ordinary bottle; the reservoir being lifted one foot or eighteen inches only above the level of the table, the fluid is allowed to flow into the canal. The vulvar orifice is compressed at intervals to produce a distention of the vaginal walls, and thereby allow the liquid to come in contact with every portion of the inflamed area. An ordinary piece of soft drainage-tubing should be used, and never the closed end of a rubber catheter with orifices on the sides. The two cases complicated by cystitis were treated under the author's immediate supervision by intra-vesicular irrigations with a 1 to 6000 solution of the same drug. Excluding these two cases, which took respectively 5 and 8 weeks to recover completely, the average time required to cure the other consecutive 30 cases was only 12½ days from the time of onset, which in some few cases was even two weeks before treatment was sought.

SUFFOCATIVE LARYNGITIS IN VARICELLA.

MARFAN and HALLÉ (*Revue mensuelle des Maladies de l'Enfance*, January, 1896) record two rare instances of severe laryngitis, one preceding, the other accompanying the appearance of a varicellous exanthem. The first case, an infant of three years, was brought under observation after an illness of three days' duration. The voice was hoarse and respiration difficult, with supra- and infra-sternal depression. The fauces were reddened, but in other respects showed no abnormal condition. After twenty-four hours an injec-

tion of 20 cubic centimetres of antidiphtheric serum was made and cultures taken. That same evening the first vesicles of varicella appeared upon the surface. The laryngeal symptoms increased, and on the following day called for tracheotomy. The first cultures from the throat, and later ones made directly from the trachea by way of the canula, demonstrated the absence of the Loeffler bacillus. After three days the canula was removed, and the case went on to complete recovery.

The second case occurred in a weakly infant of nine months. When brought to the hospital, with marked symptoms of laryngeal obstruction, a profuse confluent varicella eruption was noticeable. The throat was free from false membrane and was scarcely reddened, while no trace of vesicles was found upon the buccal mucosa or upon the pillars and uvula. This case also was regarded as probably one of primary laryngeal diphtheria complicating varicella, and an injection of antitoxin was made by Roux. Cultures taken at the same time subsequently showed the absence of diphtheria-bacilli. Death occurred on the seventh day from acute diarrhœa and broncho-pneumonia. The autopsy showed a small, round, deep ulcer at the posterior part of the margin of the right vocal cord.

These two cases of varicella of the larynx determined a stenosis giving the clinical picture of a true croup, and are in the authors' opinion unique examples. The only case of varicella involving the larynx previously reported is that recorded by Boucheron in his thesis ("Étude sur les complications respiratoires de la varicelle et relation d'un cas de varicelle du larynx," Paris, 1893), in which the affection took the aspect of a spasm of the glottis without symptoms of laryngitis. The case terminated fatally by suffocation during an access of the spasm.

The authors conclude that involvement of the larynx in varicella occurs early, about or shortly after the appearance of the eruption, a point that serves to distinguish it from secondary and unrelated infections. Anatomically this laryngitis is characterized by small ulcerations, circular, few in number, seated usually upon the true cords. About these ulcers the mucous membrane may be the seat of hyperæmia, more or less intense and extended. These two lesions explain the two forms under which the complication occurs, as is shown by the authors' cases on the one hand, and by Boucheron's on the other.

Infantile Intussusception and its Treatment.

Frederick Holme Wiggin (*Medical Record*, January 18, 1896, p. 83) presents some interesting statistics of this condition and its treatment drawn from the study of 103 cases collected from the literature. Nearly 50 per cent. occurred during the fourth, fifth, and sixth months, in nearly equal proportions; 75.4 per cent. of the cases occurred in males; and 89 per cent. were of the ileo-cæcal variety. Abdominal tumor was seldom absent, as was to be expected in such a large proportion of cases of the ileo-cæcal variety. Several of the reporters called attention to the necessity, in all suspected cases of this trouble, of making a conjoined abdominal and rectal examination, for in some instances a tumor was revealed by this means after abdominal or rectal palpation alone had failed to discover it. A protruding anal tumor occurred in the usual proportion—about 6 per cent. of the cases.

Thirty-nine of the cases were treated only by means of inflation, or enemata, or both. Of these, 16, or 41 per cent., recovered. The average hour after the onset when the treatment began was the forty first.

Of cases in which laparotomy was performed 64 were collected, 21 of which, or 32.8 per cent., were successful, the average age of the infants being 6½ months. In 17 of the cases inflation and enemata, or both, had previously been tried without success. If from the total number of cases those are eliminated in which either the operation was abandoned, the bowel incised and an artificial anus made, or resected and an anastomosis effected, there are left 45 cases, of which only 24 resulted fatally, reducing the mortality to 53.4 per cent.

If again only those operations are counted that have been performed since the perfected technique of abdominal surgery has become generally known, say since 1889, there results a total of 18 cases, of which 14 were successful and 4 unsuccessful, or a mortality of only 22.2 per cent., which the author believes is a fair estimate of the risks of abdominal section to-day performed on a young infant for the relief of this disorder, if done within the first forty-eight hours after onset.

As a final commentary upon his statistics, the author thinks that if their testimony be carefully weighed it would not be long "before we should come to look upon the treatment of this disease by enemata of air and water, much as we do to-day upon the pukes, purges, doses of metallic mercury, of gold and silver balls, of mixtures of bird-shot and olive oil, and bloodletting, which were soberly employed by good men not so many years ago for the relief of this distressing disorder."

Salpingo-ovaritis following Vulvo-vaginitis in Children.

Marx (*Revue de Thérapeutique Médico-chirurgicale*, May 1, 1895) calls attention to the dangers of a blennorrhagic vulvo-vaginitis in little girls. As in the adult female serious complications of the disease may arise, such as urethritis, purulent cystitis, and even involvement of ureters and kidneys; while, through the uterus, the tubes, ovaries, and peritoneum may participate in the infection. By rectal examination in some cases the author has been able to detect an effusion in the lateral cul-de-sacs, and in several cases he believes he has encountered suppurative salpingitis with ovaritis. In autopsies upon girls of seven to nine years of age he has five times found pus encysted in the tubes. Even if mischief does not become evident at once, disease of the adnexa is likely to appear later in life, and menstruation will be established with great difficulty.

Morphinism in Children.

Mattison (*Transactions of Section on Pædiatrics, New York Academy of Medicine*, October 10, 1895, from *Pediatrics*, January 1, 1896, p. 31) believes that chronic opium-poisoning is not very uncommon in childhood. One of the cases cited is worthy of quotation: A baby of seven months when first seen presented the shrivelled and wrinkled appearance of an old man, and attracted attention by its peculiar solemn manner. The child had been perfect at birth, and had thrived up to the age of four months, when, in order to quiet

it when fretful, it was given paregoric. It very soon became necessary to give laudanum, and to increase the dose, so that when first seen by the physician it weighed only seven pounds, and was shockingly emaciated and extremely weak. It was taking at this time no less than one ounce (!) of laudanum daily. The laudanum was reduced one drop at each dose, and at the end of one month the child had become plump and well again. In the author's experience children had shown a very strong tendency to become victims of morphinism. The consequences of the habit in children were decline and death, unless promptly treated. Prognosis is good if there be no structural lesion and nutrition has not been too greatly impaired. Abrupt withdrawal of the drug is not to be thought of, but gradual reduction of the dose, together with general tonic measures, constitutes the whole treatment.

Dr. E. A. Tucker stated that he had seen one case of congenital morphinism in hospital. It was the offspring of a mother who for several years previously had been addicted to taking morphine and also to smoking opium. At birth the child appeared to be perfectly healthy, but when handed over to a wet-nurse it began to lose ground rapidly. This he attributed to the sudden removal of the baby from the influence of the morphine to which it had been subjected in utero. In a similar case he would advise the use of small doses of morphine for a few days after birth, and then gradual withdrawal.

A Series of Cases of Multiple Neuritis in Infants.

Hammond (*Medical Record*, November 9, 1895, p. 656) gives the histories of ten cases of multiple neuritis occurring among children in the city of Bridgeport, Connecticut, within a period between December, 1894, and October, 1895. The ages of the children varied from four and one-half months to four and one-half years. Eight of the ten cases began in the warm weather of June and August, and thus confirm the experience of Medin and Saelis. In three cases both arms and both legs were paralyzed; in two cases both legs and the right arm were affected; in four cases only the legs were implicated; and in one case the intercostal muscles were the primary seat of paralysis. Two of the cases presented typical symptoms of meningitis—one, aged twenty months, recovering; the other, an infant of four and one-half months, dying after a lapse of one month, but, unfortunately, it was not subjected to post-mortem examination. The succession of cases within a limited geographical area and their great similarity point to a common cause of origin. In one case the bacillus of influenza was found in the blood, and in two others the blood showed the characteristic evidences of malaria, but this proves nothing, since grippe and malaria are common among infants; but such a series of cases as are here reported is almost unique.

The second case, in a little daughter of a physician, occurred in a house about a hundred yards from that in which the first case developed; six other cases occurred in the practice of one physician of the city; and another in the practice of the father of the child designated above as the second case. While by no means conclusive, these coincidences suggest the possibility of the communication of a contagion through the series of cases This point, however, is not raised in Dr. Hammond's paper, but is a natural conclusion from a study of the cases which he here records.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

JOHN SLADE ELY, M.D.,

PROFESSOR OF PATHOLOGY IN THE WOMAN'S MEDICAL COLLEGE OF THE NEW YORK INFIRMARY; ASSISTANT IN PATHOLOGY IN THE COLLEGE OF PHYSICIANS AND SURGEONS; PATHOLOGIST TO BELLEVUE HOSPITAL.

THE DIAGNOSIS OF NEOPLASMS FROM MICROSCOPIC EXAMINATION OF TRANSUDES.

In cases of suspected tumor of the hollow viscera, such as the stomach or bladder, and of the tissues bordering on the larger body-cavities, the pathologist is not infrequently requested by the clinician to determine from an examination of the contained liquid whether or not a neoplasm be present. The difficulties attending the decision of this question are rarely appreciated by the clinician, whose confidence in the ability of the pathologist to distinguish pathological cells of various origin from one another and from the normal cells of the body is often surprising. It has been frequently necessary to remind him that it is only exceptionally, when fragments of tissue are present, in which the relation of the cells to the stroma can be detected, that any very positive conclusion can be arrived at.

In this connection much interest attaches to the report by HERMANN RIEDER (*Deutsches Archiv f. klin. Medicin*, liv., 1895, p. 554) of a case of tumor of the peritoneum in which the diagnosis of neoplasm was made from a study of the cells contained in the peritoneal fluid, not as the result of finding portions of the tumor-mass.

The patient was a woman, forty years of age, who had enjoyed good health until three weeks before her appearance at the hospital in Munich, at which time her only symptoms seem to have been loss of appetite, pain in the abdomen after the ingestion of solids, ascites, and emaciation. Physical examination left the diagnosis between cirrhosis of the liver, obstruction of the portal vein, and peritoneal tumor uncertain. Examination of the sediment obtained from four litres of peritoneal fluid removed by paracentesis led Rieder to the diagnosis of neoplasm, which was subsequently verified by autopsy.

The diagnosis was based upon the presence in the fluid of many polymorphous cells of various sizes, mono- and polynuclear, many of them vacuolated, and some of them showing evidences of active cell-division. Similar cells were found in the fluid obtained at subsequent tappings from the abdomen and left side of the chest. During the entire course of the case no tumor of any kind was discoverable on palpation.

The appearance of the cells which led Rieder to diagnosticate a malignant growth is well shown in two plates which illustrate the article, and which should be consulted for a clear picture of their peculiarities. The points upon which emphasis is particularly laid are the irregularity of shape, size, and consistence of the cell-body, its frequent vacuolation, the variety of shape, size, and location of the nucleus in the cell-body, the multiplicity of nuclei in some of the cells, and the evidences of both direct and indirect (karyokinetic) cell-division, often very anomalous in type.

The manner in which these peculiarities of the cells were made apparent is also of interest, as evidences of karyokinesis often disappear with great rapidity. The fluids obtained by tapping were taken at once to the laboratory and their sediment was immediately collected with the aid of the centrifugal machine. This was then spread in a thin layer on cover-glasses, was allowed to dry, and was immersed in alcohol and ether, equal parts, for an hour, after which its cells could be readily stained by a weak hæmatoxylin solution.

It is also of interest in this case that a secondary growth made its appearance at the site of one of the abdominal punctures, the result, Rieder is inclined to believe, of an engraftment on the fresh surface of the wound of some of the tumor-cells so abundant in the fluid, and which examination showed to be in active karyokinesis.

In conclusion reference is made to a communication by Neelsen to the *Dresdener Gesellschaft für Naturwissenschaft* in which the diagnosis of carcinoma of the bladder was based upon the presence in the urine of cells undergoing irregular karyokinesis.

Casts without Albumin.

The occurrence of casts in the urine without albuminuria has been recognized as frequent in jaundice and as occasional in some other conditions in which degeneration of the epithelium of the renal tubules is met with, but at best this has been regarded as exceptional. It is, therefore, matter of some surprise to find Kossler (*Berliner klinische Wochenschrift*, 1895, Nos. 14 and 15) describing the occurrence of casts without albumin in 29 cases of diseases of various types. They were separated from the urine by means of the centrifugal machine.

The diseases in which this result was obtained were for the most part members of the infectious group, as phthisis, scarlatina, typhoid fever, pneumonia, and other febrile disorders, though it was also observed in cardiac disease and in phosphorus-poisoning. The casts found were of almost all varieties—hyaline, granular, fatty, epithelial, blood, leucocyte, and occasionally waxy—and they were often present in considerable numbers.

Kossler is therefore loath to accord much diagnostic importance to the presence of casts alone in cases of suspected nephritis, especially as in several of his cases in which he was able to make a subsequent examination of the kidneys no structural evidence of nephritis was discoverable.

Notice to Contributors.—All communications intended for insertion in the Original Department of this Journal are only received *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from abroad written in a foreign language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

Dr. Edward P. Davis, 250 South 21st Street, Philadelphia, U. S. A.

Or

Dr. Hector Mackenzie, 59 Welbeck St., Cavendish Sq., London, W., Eng.

CONTENTS.

ORIGINAL COMMUNICATIONS.

PAGE

Congenital Erosion and Split of the Cervix Uteri. By C. B. Penrose, M.D., Ph.D. 503

A Study of Three Cases of Tumor of the Brain in which Operation was Performed; One Recovery, Two Deaths. By Leopold Stieglitz, M.D. With Remarks by Arpad G. Gerster, M.D., and Howard Lilienthal, M.D. 509

Syphilis and the Etiology of Atheroma. By F. Parkes Weber, M.A., M.D., M.R.C.P. Lond. 531

Supravaginal Hysterectomy for Impossible Labor, with Intrapelvic Treatment of Stump. By B. F. Baer, M.D. 537

Supravaginal Hysterectomy for Impossible Labor, with Intrapelvic Treatment of Stump. By Edward P. Davis, A.M., M.D. 543

Bullet-wounds of Peritoneal Cavity and Contained Viscera. By L. M. Tiffany, M.D. 550

A Contribution to Our Knowledge of Albumosuria. By M. L. Harris, M.D. . 557

REVIEWS.

Pædiatrics. The Hygienic and Medical Treatment of Children. By Thomas Morgan Rotch, M.D. 570

Textbook of General Pathology and Pathological Anatomy for Physicians and Students. By Dr. Ernst Ziegler 572

Surgery: A Practical Treatise with Special Reference to Treatment. By C. W. Mansell Moullin, M.A., M.D. Oxon. 574

Diagnosis of Diseases of the Abdominal Organs. By Prof. Hans Leo . . . 576

Clinical Illustrations of the Diseases of the Fallopian Tubes and of Tubal Gestation. By Charles J Cullingworth, M.D. 578

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

	PAGE		PAGE
Therapeutic Uses of Mescal Buttons	579	Serum-therapy by Intestinal Route	587
The Action of Anemonin	579	Tetany Treated by Thyroid Extract	586
Treatment of Chorea	580	Treatment of a "Common Cold"	587
Antithermics and Analgesics in Therapeutics and Ophthalmology	580	Hæmatogenic Power of Heavy Metals	588
Theobromine in Diseases of the Heart and Kidneys	580	Cold Baths in Delirium Tremens	588
Treatment of Enuresis	581	Treatment of Malignant Neoplasms	588
Hæmato-catharsis	582	A New Antiseptic Wound-treatment	589
Charcoal	582	Vaseline-spray in Nasal Inflammation	590
Stypticin	583	Treatment of Tetanus	590
Bone-marrow in Anæmia	583	Defects in Artificial Respiration	590
Bone-marrow in Diphtheria	584	Treatment of Rheumatism	591
Antitoxin in Diphtheria	584	Creosote-poisoning	591
Antidiphtheritic Serum	585	Duboisine-poisoning	591
Snake-venom Antitoxin	585	Suggestion in Ether-administration	592
The Serum-therapy of Variola	586	Water-parsnip-poisoning	592
Anticholera-inoculation	587	Sulphonal in Enuresis	593
		Treatment of Malarial Fever in Infancy	593
		Antipyrine for Conjunctivitis	593

MEDICINE.

	PAGE		PAGE
A Little-known Occupation-neurosis	594	Sudden Death from Embolism of both Coronary Arteries	597
Aspergillar Pseudo-tuberculosis	594	Sodium Salicylate and the Formation and Excretion of Uric Acid	597
Relapse in Pneumonia	595	Icterus from Lactophen-intoxication	598
Changes in Huntington's Chorea	595	An Unusual Case of Ascites	598
Acute Leukæmia	596		
Iodine in the Thyroid Gland	597		

SURGERY.

Radical Operation of Herniæ	599	The Streptococcus and Anti-streptococcic Serum	600
Five Unusual Cases of Abscess in Connection with Vermiform Appendix	600	Angeiocholitis and Cholecystitis	601

OPHTHALMOLOGY.

Abnormal Movements of the Eyelids	602	Relaxation of the Skin of the Lids	605
Paresis of the Ocular Branch of the Sympathetic	603	Treatment of Entropion and Trichiasis	606
Congenital Night-blindness	603	Migration of Subhyaloid Hemorrhage	607
Hydraulic Curetting of the Cornea	604	Scopolamin Hydrochlorate	607
Descending Optic Neuritis Consequent upon Nasal Treatment	604	Formalin in Ophthalmic Practice	607
Prevalence of Trachoma	605	Diffuse Sarcoma of the Choroid	608
Treatment of Ocular Syphilis	606	Oyster-shucker's Keratitis	608
		Strychnine for Insufficiency of the Internal Recti Muscles	608

OTOLOGY.

Foreign Body in the Ear	609	Passage of Suppuration to Brain by way of the Carotid Canal	611
Objective Noise in the Ear	609	Involuntary Opening of Lateral Sinus	611
Carcinoma of External Auditory Canal	609	Spontaneous Rupture of Mastoid Cells	611
Treatment in Diseases of the Ear	609	Abscess in the Temporal Lobe	611
Ménière's Symptoms, or Phenomena	610	Sinus-phlebitis	612
Otitic Facial Paralysis	610		

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

Abscess of the Tonsil	612	Correcting Deformities of the Nose	615
Fibroma of the Nasal Septum	613	Suppurative Disease of the Accessory Sinuses of the Nose	615
Tuberculous Infiltration of Pharynx and Tongue	613	Tracheotomy in Bilateral Paralysis of the Crico-arytenoid Muscles	615
Treatment of Laryngeal Tuberculosis	614		

OBSTETRICS.

Partial Abortion	616	Suspension of the Uterus	618
Cæsarean Section for Eclampsia	617	Fixation of the Uterus	620
The Advantages of Symphysiotomy	617	Ferripyrin, a New Hæmostatic for Obstetric Use	621
Symphysiotomy	618		

GYNECOLOGY.

Sympathetic Ganglion in the Ovary	621	Extirpation of Carcinoma of Vagina	623
Fibro-sarcoma of the Ovary	622	Influence of Fibro-myomata on their Environment	623
Inversion of the Non-puerperal Uterus	622		

PATHOLOGY AND BACTERIOLOGY.

Identification of the Thyroid Bacillus	623	Closure of the Coronary Arteries	627
The Etiology of Pneumothorax	627		